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THE SEASONAL DISTRIBUTION  
OF  
ATLANTIC PLANKTON  
ORGANISMS

BY  
**P. T. CLEVE**



GÖTEBORG  
D. F. BONNIERS BOKTRYCKERI AKTIEBOLAG

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# INTRODUCTION

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The distribution of the Atlantic plankton organisms has hitherto been examined by some expeditions, such as the Challenger and National Expeditions and others. These however, only crossed the Atlantic during certain seasons for a relatively short time, and in different years. As the plankton follows the ocean currents and its distribution is subject to continual changes, it is evident that the knowledge thus obtained must be very fragmentary. In order to get more complete information about this matter Professor O. PETERSSON, Mr GUSTAF EKMAN and the present author planned a systematical investigation of the waters of the Atlantic during the space of at least one year, as far as temperature, salinity and surface-plankton were concerned. To assist us in carrying out this programme, we communicated with a number of ocean-liners and other vessels and it affords us pleasure to state that the officers were very willing to assist us in procuring samples for scientific examination. Samples were taken once a day at least, in some cases several times, with simultaneous observation of the temperature of the water. The plankton was obtained by pumping water for 10 to 15 minutes at a time through a fine silk net, the small residuum being then transferred to a bottle containing alcohol. The samples thus obtained were in most cases very small, but usually sufficiently large to characterize the water. In some cases the number of different species was astonishingly large.

Furthermore we tried to get samples collected regularly at certain fixed stations, as at Westmannaö (S. Iceland), the Färöes and the Azores.

To defray the expenses connected with these researches the sum of 7,000 kronor was obtained from the fund »Lars Hiertas minne», and for the publishing of the results by the »Göteborgs Vetenskaps- och Vitterhets-samfund» Mr AUGUST RÖHSS contributed the sum of 3,000 kronor, which we here thankfully acknowledge.

All the samples of plankton have been examined by me, both for animals and plants. The observations were registered month by month, and the results brought together so as to show for each month the area of distribution for all Atlantic plankton organisms.

In order to render these observations more complete I also made use of a number of data published by OSTENFELD, by GEORGE MURRAY & F. G. WHITTING and by AURIVILLIUS\*.

For every species I have calculated the mean temperature and salinity and indicated the maxima and minima. In calculating these averages for species that occur gregariously I have only used, as a rule, such samples as contained the species in question abundantly.

In spite of the great number of observations obtained, the survey of the plankton of the Atlantic is by no means to be considered as a complete one, as samples were not collected from all parts of the ocean every month. In order to show to what extent the survey has been carried out it will be necessary to state what parts of the ocean have been examined each month. I therefore prepared the following

### List of routes and stations, where samples have been collected:

1897 *December*: Dutch Steamer »*Prins Frederik Hendrik*»: 19<sup>th</sup> to 31<sup>th</sup>, from 45° N. 13° W. to 12° N. 50° W. — Number of samples 13.

1898 *January*: Dutch Steamer »*Prins Willem V*»: 17<sup>th</sup> to 30<sup>d</sup>, from 48° N. 6° W. to 11° N. 52° W. Dutch Steamer »*Prins Frederik Hendrik*»: 1<sup>th</sup> to 30<sup>d</sup>, from 7° N. 53° W. to 37° N. 73° W. French Steamer »*Les Alpes*»: 15<sup>th</sup> to 28<sup>th</sup>, from 34° N. 14° W. to 17° S. 38° W. — Number of samples 41.

*February*: Swedish Corvette »*Freya*»: 22<sup>d</sup> to 28<sup>th</sup>, from 6° S. 12° E. to 5° S. 0° W. French Steamers »*La Gascogne*»: 27<sup>th</sup> and 28<sup>th</sup>, from 50° N. 7° W. to 49° N. 17° W. and »*La Cham-*

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\* OSTENFELD: Iagttagelser over overfladvandets temperatur, saltholdighed og plankton paa islandske og grønlandske skibsrouter i 1898, foretagne under ledelse af C. F. WANDEL, Copenh. 1899.

G. MURRAY & WHITTING: New Peridiniacea from the Atlantic. Trans. Linn. Soc. of London 2nd Ser. Botany. Vol. V. Part. 9, 1899.

AURIVILLIUS: Kongl. Svenska Vetenskaps-Akademiens Handlingar. Vol. XXXII, No 6, 1899.

*pagne*»: 12<sup>th</sup> to 17<sup>th</sup>, from 50° N. 10° W. to 45° N. 49° W. Dutch Steamers »*Prins Frederik Hendrik*»: 6<sup>th</sup> to 20<sup>th</sup>, from 38° N. 74° W. to 13° N. 70° W. and »*Prins Willem V*»: 19<sup>th</sup> to 26<sup>th</sup>, from 15° N. 71° W. to 34° N. 74° W. — Number of samples 22.

*March*: British Steamer »*Lake Huron*» 28<sup>th</sup> to 31<sup>th</sup>, from 55° N. 12° W. to 49° N. 33° W. Dutch Steamers »*Oranje Nassau*»: 5<sup>th</sup> to 24<sup>th</sup>, from 46° N. 12° W. to 9° N. 59° W., »*Prins Willem V*»: 8<sup>th</sup> to 16<sup>th</sup>, from 28° N. 74° W. to 32° N. 74° W., »*Prins Frederik Hendrik*»: 7<sup>th</sup> to 23<sup>d</sup>, from 7° N. 55° W. to 48° N. 6° W. French Steamers »*Les alpes*»: 3<sup>d</sup> to 12<sup>th</sup>, from 0° S. to 30° N. 13° W., »*La Bourgogne*»: 20<sup>th</sup> to 26<sup>th</sup>, from 50° N. 11° W. to 41° N. 66° W., »*La Gascogne*»: 1<sup>th</sup> to 6<sup>th</sup>, from 48° N. 27° W. to 40° N. 72° W. and 10<sup>th</sup> to 18<sup>th</sup> from 40° N. 68° W. to 49° N. 2° W., »*La Navarre*»: 13<sup>th</sup> to 20<sup>th</sup>, from 49° N. 9° W. to 40° N. 68° W., and 24<sup>th</sup> to 31<sup>th</sup>, from 40° N. 64° W. to 50° N. 9° W. — Swedish Corvette »*Freja*»: 1<sup>th</sup> to 30<sup>th</sup>, from 6° S. 4° W. to 41° N. 23° W. The vessels »*Capella*»: 5<sup>th</sup> to 10<sup>th</sup>, from 60° N. 4° E. to 71° N. 1° W., »*Gimle*»: 23<sup>d</sup> to 26<sup>th</sup>, from 58° N. 6° E. to 62° N. 11° W. — Station: Nålsöfjord (Färöes) the 22<sup>d</sup> — Number of samples 120.

*April*: British Steamer »*Lake Huron*»: 1<sup>th</sup> to 3<sup>d</sup>, from 47° N. 40° W. to 43° N. 50° W. Dutch Steamers »*Oranje Nassau*»: 3<sup>d</sup> to 26<sup>th</sup>, from 14° N. 70° W. to 23° N. 72° W., »*Prins Willem V*»: 5<sup>th</sup> to 19<sup>th</sup>, from 7° N. 54° W. to 47° N. 10° W. French Steamers »*La Bourgogne*»: 1<sup>th</sup> to 6<sup>th</sup>, from 41° N. 57° W. to 50° N. 9° W. and 25<sup>th</sup> to 29<sup>th</sup>, from 49° N. 23° W. to 42° N. 61° W., »*La Gascogne*»: 3<sup>d</sup> to 10<sup>th</sup>, from 50° N. 10° W. to 40° N. 60° W. and 17<sup>th</sup> to 24<sup>th</sup>, from 40° N. 67° W. to 50° N. 3° W. Swedish Corvette »*Freja*»: 1<sup>th</sup> to 13<sup>th</sup>, from 41° N. 19° W. to 48° N. 5° W. The vessels »*Capella*»: 26<sup>th</sup> to 28<sup>th</sup>, from 73° N. 5° W. to 75° N. 9° W., »*Gimle*»: 6<sup>th</sup> to 24<sup>th</sup>, from 63° N. 18° W., to 58° N. 2° W., »*Victoria*»: 26<sup>th</sup> to 27<sup>th</sup>, 62° N. 2° E. to 60° N. 1° W. Stations: Vestmannaö, one sample; Färöes, one sample. — Number of samples 72.

*May*: Dutch Steamer »*Oranje Nassau*»: 5<sup>th</sup> to 31<sup>th</sup>, from 16° N. 71° W. to 6° N. 55° W. and from 7° N. 54° W. to 32° N. 36° W. French Steamers »*La Bourgogne*»: 9<sup>th</sup> to 14<sup>th</sup>, from 41° N. 59° W. to 50° N. 12° W. and 23<sup>d</sup> to 27<sup>th</sup> from 49° N. 23° W. to 42° N. 61° W., »*La Gascogne*»: 8<sup>th</sup> to 15<sup>th</sup>, from 50° N. 11° W. to 40° N. 72° W. and 22<sup>d</sup> to 29<sup>th</sup>, from 40° N. 68° W. to 50° N. 7° W.,

»*St Simon*»: 21<sup>th</sup> to 31<sup>th</sup>, from 43° N. 11° W. to 29° N. 60' W. *Swedish Expedition to Spitzbergen under A. G. Nathorst.* — The vessels »*Capella*»: 7<sup>th</sup> to 31<sup>th</sup>, from 77° N. 2' W. to 67° N. 25° W., »*Sönderjülland*»: 19<sup>th</sup> to 22<sup>d</sup>, from 61° N. 1° W. to 58° N. 4° E., »*Victoria*»: 2<sup>d</sup> to 7<sup>th</sup>, from 62° N. 2' E. to 60° N. 3° E. Stations: Vestmannaö, 3 samples, Färöes, 6 samples. — Number of samples 105.

*June*: Dutch Steamers »*Oranje Nassau*»: 1<sup>st</sup> to 6<sup>th</sup>, from 34' N. 33° W. to 46° N. 11° W., »*Prins Willem II*»: 24<sup>th</sup> to 30<sup>th</sup>, from 29° N. 36° W to 10° N. 53° W. — French Steamers »*La Bourgogne*»: 6<sup>th</sup> to 11<sup>th</sup>, from 41° N. 59° W. to 50° N. 12° W., »*St Simon*»: 20<sup>th</sup> to 30<sup>th</sup>, from 19° N. 63' W. to 48° N. 17' W. — Collection of Mr K. BOHLIN: 13<sup>th</sup> to 24<sup>th</sup>, from 48° N. 6° W. to 35° N. 21° W. — *The Swedish Expedition to Spitzbergen under A. G. Nathorst.* — »*Capella*»: 1<sup>th</sup> to 30<sup>th</sup>, from 66° N. 26° W. to 68° N. 13° W., »*Victoria*»: 9<sup>th</sup> to 16<sup>th</sup>, at 62° N. 2' E. Fishing yacht: 2<sup>d</sup> to 25<sup>th</sup>, from 58° N. 2° W. to 61° N. 1° W. Stations: Vestmannaö, 2 samples, Färöes, 3 samples, Azores, 3 samples (collected by Mr K. BOHLIN). — Number of samples 99.

*July*: Dutch Steamer »*Prins Willem II*»: 19<sup>th</sup> to 27<sup>th</sup>, from 15° N. 71° W. to 38° N. 74° W. — French Steamers »*La Gascogne*»: 17<sup>th</sup> to 23<sup>d</sup>, from 50° N. 10° W. to 40° N. 66° W and 31<sup>th</sup>, 40° N. 67° W., »*St Simon*»: 1<sup>th</sup> and 2<sup>d</sup>, 48° N. 14' W. to 50° N. 8° W., »*La Touraine*»: 24<sup>th</sup> to 30<sup>th</sup>, from 50° N. 11° W. to 40° N. 69° W., »*La Ville de Marseille*»: 22<sup>d</sup> to 30<sup>th</sup>, from 41° N. 17° W. to 21° N. 58° W. — *The Swedish Expedition to Spitzbergen under A. G. Nathorst.* — The vessels »*Capella*»: 1<sup>th</sup> to 7<sup>th</sup>, from 68° N. 8' W to 60° N. 0° E., »*Gimle*»: 10<sup>th</sup> to 27<sup>th</sup>, from 67° N. 22' W. to 59° N. 2° W., »*Sönderjülland*»: 1<sup>th</sup> to 8<sup>th</sup>, from 59° N. 2° E. to 61° N. 4° W., »*Victoria*»: 17<sup>th</sup> and 25<sup>th</sup>, at 62° N. 0° W. Stations: Vestmannö, 2 samples, Färöes, 2 samples, Azores 4 samples. — Number of samples 68.

*August*: British Steamer »*Lake Superior*»: 22<sup>d</sup> to 28<sup>th</sup>, from 56° N. 13° W. to 52° N. 55° W. — Dutch Steamer *Prins Willem II*»: 6<sup>th</sup> to 19<sup>th</sup>, from 38° N. 74° W. to 14° N. 70° W. — French Steamers »*La Gascogne*»: 1<sup>th</sup> to 6<sup>th</sup>, from 40° N. 59° W. to 49° N. 14° W., 14<sup>th</sup> to 20<sup>th</sup>, from 50° N. 10° W. to 40° N. 66° W., 28<sup>th</sup> to 31<sup>th</sup>, from 40° N. 67° W. to 44° N. 42° W., »*La Touraine*»: 7<sup>th</sup> to 12<sup>th</sup>, from 42° N. 65° W. to 49° N. 20° W., 21<sup>th</sup> to 27<sup>th</sup>, from 50° N.



12° W. to 41° N. 72° W. — *Swedish Expedition to Spitzbergen under A. G. Nathorst*. The vessels »Sönderjülland»: 11<sup>th</sup> at 59° N. 2° W., »Gimle»: 11<sup>th</sup> to 14<sup>th</sup>, from 60° N. 3° W. to 66° N. 18° W., »Victoria»: 19<sup>th</sup> to 21<sup>th</sup>, at 61° N. 4° E. Stations: Vestmannaö, 2 samples, Färöes, 1 samples, Azores 4 samples. — Number of samples 100.

*September*: British Steamer »Lake Superior»: 11<sup>th</sup> to 16<sup>th</sup>, from 53° N. 50° W. to 56° N. 12° W. and 26<sup>th</sup> to 30<sup>th</sup>, from 57° N. 14° W. to 55° N. 43° W. — Dutch Steamers »Prins Frederik Hendrik»: 18<sup>th</sup> to 27<sup>th</sup>, from 15° N. 71° W. to 38° N. 74° W., »Prins Willem II»: 6<sup>th</sup> to 21<sup>th</sup>, from 9° N. 53° W. to 49° N. 3° W. — French Steamers »La Gascogne»: 1<sup>th</sup> to 3<sup>d</sup>, from 47° N. 33° W. to 50° N. 14° W. and 18<sup>th</sup> to 24<sup>th</sup>, from 50° N. 11° W. to 41° N. 65° W., »La Touraine»: 4<sup>th</sup> to 10<sup>th</sup>, from 41° N. 66° W. to 50° N. 9° W. *Swedish Expedition to Spitzbergen*. The vessels »Sigyn»: 2<sup>d</sup> to 19<sup>th</sup>, from 33° N. 16° W. to 8° N. 25° W., »Gimle»: 14<sup>th</sup> to 17<sup>th</sup>, from 66° N. 18° W. to 61° N. 2° W., »Sönderjülland»: 4<sup>th</sup> to 7<sup>th</sup>, from 62° N. 6° W. to 60° N. 2° W. Stations: Vestmannaö, 3 samples, Färöes, 1 sample, Azores, 5 samples. — Number of samples 99.

*October*: British Steamer »Lake Superior»: 1<sup>th</sup> 53° N. 51° W. and 16<sup>th</sup> to 31<sup>th</sup>, from 53° N. 52° W. to 56° N. 12° W. — Dutch Steamer »Prins Frederik Hendrik»: 6<sup>th</sup> to 19<sup>th</sup>, from 38° N. 74° W. to 16° N. 70° W. — French Steamers »Canada»: 29<sup>th</sup> to 31<sup>th</sup>, from 42° N. 15° W. to 37° N. 27° W., »La Gascogne»: 3<sup>d</sup> to 8<sup>th</sup>, from 40° N. 59° W. to 50° N. 14° W., 30<sup>th</sup> and 31<sup>th</sup>, from 50° N. 10° W. to 50° N. 20° W., »La Touraine»: 23<sup>d</sup> to 29<sup>th</sup>, from 50° N. 10° W. to 41° N. 67° W. Swedish vessel »Sigyn»: 5<sup>th</sup>, at 21° S. 36° W. Stations: Vestmannaö, 2 samples, Färöes, 3 samples, Azores, 5 samples. — Number of samples 44.

*November*: British Steamers »Lake Superior»: 1<sup>th</sup> to 7<sup>th</sup>, from 56° N. 17° W. to 53° N. 50° W. and 21<sup>th</sup> to 27<sup>th</sup>, from 48° N. 49° W. to 55° N. 14° W., »Tucoman»: 15<sup>th</sup> to 29<sup>th</sup>, from 45° N. 7° W. to 9° S. 34° W. — French Steamers »Canada»: 1<sup>th</sup> to 6<sup>th</sup>, from 34° N. 33° W. to 19° N. 58° W., »La Gascogne»: 1<sup>th</sup> to 5<sup>th</sup>, from 49° N. 28° W. to 42° N. 64° W., 13<sup>th</sup> to 19<sup>th</sup>, from 40° N. 67° W. to 49° N. 12° W. and 27<sup>th</sup> to 30<sup>th</sup>, from 50° N. 10° W. to 48° N. 41° W., »La Touraine»: 6<sup>th</sup> to 12<sup>th</sup>, from 41° N. 66° W. to 50° N. 11° W. and 20<sup>th</sup> to 26<sup>th</sup>, from 50° N. 10° W. to 41° N. 69° W. — The Swedish Corvette »Freya»: 14<sup>th</sup>, at 31° N. 18° W. — The Swedish

vessel »*Sigyn*»: 5<sup>th</sup> to 18<sup>th</sup>, from Rio Janeiro to 18° S. 31° W. Stations: Vestmannaö, 2 samples, Färöes, 2 samples, Azores, 4 samples. — Number of samples 78.

*December*: British Steamer »*Tucoman*»: 1<sup>th</sup> to 15<sup>th</sup>, from 14° S. 36° W. to 29° S. 49° W. — French Steamers »*Canada*»: 2<sup>d</sup> to 12<sup>th</sup>, from 19° N. 58° W. to 44° N. 10° W., »*La Gascogne*»: 1<sup>th</sup> to 3<sup>d</sup>, from 46° N. 50° W. to 42° N. 63° W., 11<sup>th</sup> to 17<sup>th</sup>, from 41° N. 66° W. to 50° N. 9° W. and 25<sup>th</sup> to 31<sup>th</sup>, from 50° N. 12° W. to 43° N. 61° W., »*La Touraine*»: 4<sup>th</sup> to 10<sup>th</sup>, from 41° N. 66° W. to 50° N. 18° W. — The Swedish Corvette »*Freya*»: 21<sup>th</sup> to 31<sup>th</sup>, from 28° N. 17° W. to 29° N. 14° W. — The vessel »*Sigyn*»: 20<sup>th</sup>, at 18° N. 67° W. Stations: Vestmannaö, 2 samples, Färöes, 2 samples, Azores, 3 samples. — Number of samples 55.

1899 *January*: French Steamer »*La Gascogne*»: 1<sup>th</sup> to 13<sup>th</sup>, from 41° N. 69° W. to 50° N. 20° W. Swedish Corvette »*Freya*»: 2<sup>d</sup> to 10<sup>th</sup>, from 31° N. 16° W. to 29° N. 16° W. Stations: Vestmannaö, 5 samples, Färöes, 2 samples. — Number of samples 22.

*February*: Swedish vessel »*Sigyn*»: 19<sup>th</sup> to 22<sup>d</sup>, from 32° N. 47° W. to 34° N. 40° W. — Stations: Färöes, 2 samples. — Number of samples 5.

*March*: Dutch steamer »*Oranje Nassau*»: 18<sup>th</sup> to 29<sup>th</sup>, from 48° N. 6° W. to 18° N. 45° W. — The Swedish Corvette »*Freya*»: 12<sup>th</sup>, at 35° N. 16° W. The vessels »*Sigyn*»: 11<sup>th</sup> to 13<sup>th</sup>, from 47° N. 8° W. to 49° N. 9° W., »*Thyra*»: 9<sup>th</sup> to 29<sup>th</sup>, from 62° N. 7° W. to 65° N. 24° W., »*Capella*»: 8<sup>th</sup> to 12<sup>th</sup>, from 62° N. 1° E. to 71° N. 4° W. — Stations: Färöes, 1 sample. — Number of samples 36.

*April*: Dutch Steamer »*Oranje Nassau*»: 8<sup>th</sup> to 27<sup>th</sup>, from 9° N. 59° W. to 36° N. 74° W. — The Swedish Corvette »*Freya*»: 1<sup>th</sup> to 11<sup>th</sup>, from 37° N. 9° W. to 50° N. 6° W. — The vessel »*Capella*»: 27<sup>th</sup> to 29<sup>th</sup>, from 73° N. 9° E. to 74° N. 8° E. — Stations: Vestmannaö, 2 samples, Färöes, 2 samples. — Number of samples 25.

*May*: British Steamer »*Lake Superior*»: 20<sup>th</sup> to 27<sup>th</sup>, from 47° N. 57° W. to 51° N. 14° W. — Dutch Frigate »*Atjeh*»: 24<sup>th</sup> to 31<sup>th</sup>, from 33° S. 16° E. to 24° S. 7° E., Steamer »*Oranje Nassau*»: 6<sup>th</sup> to 7<sup>th</sup>, from 38° N. 74° W. to 35° N. 75° W. Swedish *Expedition to Greenland under A. G. NATHORST*: 26<sup>th</sup> to 31<sup>th</sup>, from 58° N. 9° E. to 61° N. 1° E. The vessels »*Capella*»: 5<sup>th</sup> to 30<sup>th</sup>, from 75° N. 5° W. to 70° N. 0° W., »*Ceres*»: 15<sup>th</sup> to 30<sup>th</sup>, from 58° N. 9° E. to 66° N. 24° W., »*Victoria*»: 6<sup>th</sup> to 13<sup>th</sup>, at 62° N. 2° E.

Stations: Vestmannaö, 2 samples, Färöes, 3 samples. — Number of samples 71.

*June:* Dutch Frigate »*Atjeh*»: 1<sup>th</sup> to 30<sup>th</sup>, from 24° S. 6° E. to 9° N. 25° W., Steamer »*Oranje Nassau*»: 5<sup>th</sup> to 11<sup>th</sup>, from 12° N. 52° W. to 36° N. 30° W. *Swedish Expedition to Greenland (Antarctic)*: 1<sup>th</sup> to 30<sup>th</sup>, from 62° N. 1° E. to 75° N. 15° W. The vessel »*Capella*»: 2<sup>d</sup> to 27<sup>th</sup>, from 71° N. 6° E. to 74° N. 24° E. Steamer »*Rurik*»: 18<sup>th</sup> to 28<sup>th</sup>, from 64° N. 7° E. to 78° N. 12° E. Yacht »*Victoria*»: 5<sup>th</sup> to 17<sup>th</sup>, at 62° N. 2° E. Stations: Vestmannaö, 1 sample. — Number of samples 93.

*July:* British Steamer »*Lake Superior*»: 10<sup>th</sup> to 17<sup>th</sup>, from 56° N. 15° W. to 52° N. 54° W., 30<sup>th</sup> to 31<sup>th</sup>, from 51° N. 47° W. to 53° N. 42° W. — Dutch Frigate »*Atjeh*»: 1<sup>th</sup> to 31<sup>th</sup>, from 11° N. 26° W. to 48° N. 23° W. — *Swedish Expedition to Greenland (Antarctic)*: 2<sup>d</sup> to 29<sup>th</sup>, from 75° N. 18° W. to 71° N. 21° W. »*Capella*»: 4<sup>th</sup> to 10<sup>th</sup>, from 71° N. 32° E. to 79° N. 53° E. »*Rurik*»: 1<sup>th</sup> to 17<sup>th</sup>, from 78° N. 11° E. to 80° N. 16° E. »*Victoria*»: 11<sup>th</sup> to 22<sup>d</sup>, at 61° N. 0° W. — Number of samples 60.

*August:* British Steamer »*Lake Superior*»: 1<sup>th</sup> to 4<sup>th</sup>, from 54° N. 34° W. to 55° N. 9° W. and 14<sup>th</sup> to 19<sup>th</sup>, from 56° N. 14° W. to 52° N. 53° W. — Dutch Frigate »*Atjeh*»: 3<sup>d</sup> to 8<sup>th</sup>, from 48° N. 20° W. to 49° N. 9° W. *Swedish Expedition to Greenland (Antarctic)*: 7<sup>th</sup> to 31<sup>th</sup>, from 71° N. 23° W. to 72° N. 16° W. The vessels, »*Capella*»: 4<sup>th</sup> to 16<sup>th</sup>, from 80° N. 51° E. to 72° N. 26° E., »*Victoria*»: 13<sup>th</sup> and 29<sup>th</sup>, 60° N. 3° E. to 61° N. 0° W. — Number of samples 36.

*September:* British Steamer »*Lake Superior*»: 2<sup>d</sup> to 7<sup>th</sup>, from 52° N. 55° W. to 56° N. 17° W. and 18<sup>th</sup> to 25<sup>th</sup>, from 55° N. 9° W. to 53° N. 51° W. *Swedish Expedition to Greenland (Antarctic)*: 1<sup>th</sup> to 9<sup>th</sup>, from 72° N. 16° W. to 60° N. 3° E. »*Rurik*»: 3<sup>d</sup> to 17<sup>th</sup>, from 80° N. 16° E. to 57° N. 7° E. — Number of samples 47.

*October:* British Steamer »*Lake Superior*»: 8<sup>th</sup> to 13<sup>th</sup>, from 53° N. 52° W. to 56° N. 15° W. and 26<sup>th</sup> to 30<sup>th</sup>, from 52° N. 14° W. to 53° N. 37° W. — Number of samples 11.

*November:* British Steamer »*Lake Superior*»: 1<sup>th</sup> to 2<sup>d</sup>, from 53° N. 43° W. to 52° N. 48° W. and 14<sup>th</sup> to 20<sup>th</sup>, from 47° N. 51° W. to 51° N. 13° W. — Number of samples 9.

The total number of samples from the surface of the Atlantic thus amounts to 1,331, of which 861 were from 1898 (December 1897 included) and 415 from 1899.

## PLANKTON-TYPES.

In the following report on the seasonal distribution of the Atlantic plankton organisms I again use the signs *C*, *D*, *S*, *T*, which denote, as in my previous papers on this matter, *Chæto*-, *Desmo*-, *Styli*- and *Tricho-plankton*, *Nm*, *Ns* and *Ng*, *Southern*, *Northern* and *Arctic neritic plankton*. The new sign *Nt* denotes *Tropical neritic plankton*. The *Sira-plankton* in my former publications may be disregarded for the Atlantic, as this type corresponds partly to *T* and partly to *Ng*. The *Sira-plankton* which appears in the Skagerak, as a rule in February and March, contains neritic arctic species intermingled with boreal species and some forms, which belong to the *Tricho-plankton*. As this kind of plankton is very characteristic for the Skagerak, it may be useful to keep the name for the said plankton in the Skagerak.

In the following lists the letters B, I, M, P, R and W denote the Baltic, Indian Ocean, Mediterranean, Pacific, Red Sea and White Sea.

I. **Tricho-plankton.** I have arranged most species of this type thus:

### Tricho-plankton (Arctic oceanic species) *T*.

	Limits Lat. N.	Mean tem- perature	Mean salinity	Distribution outside the Atlantic
<i>Fritillaria borealis</i> .....	81°—50°	7.4	34.00	Antarctic.
<i>Boreophausia inermis</i> .....	78°—63°	3.4	35.09	
<i>Nyctiphanes norvegicus</i> .....	75°—61° (42)	0.6	35.10	
<i>Thysanoessa longicaudata</i> .....	85°—48°	6.0	34.84	
<i>Euthemisto libellula</i> .....	85°—40°	2.9	34.86	
<i>Parathemisto oblivia</i> .....	85°—45°	2.9	34.15	
<i>Calanus finmarchicus</i> .....	85°—30°	7.8	34.80	Antarct. M. P. I.
<i>C. hyperboreus</i> .....	85°—58°	2.0	34.98	
<i>Chiridius armatus</i> .....	85°—65°	0.0	34.81	
<i>Euchæta norvegica</i> .....	85°—58°	2.3	35.12	
<i>Metridia longa</i> .....	85°—58°	0.7	34.94	
<i>Oncaea conifera</i> .....	78°—62°	0.7	34.98	M. R. I. P. New Siberian Islands.
<i>O. minuta</i> .....	78°—38°	5.0	35.02	

	Limits Lat. N.	Mean- tem- perature	Mean salinity	Distribution outside the Atlantic
<i>Conchoecia borealis</i> .....	85°—58°	1.3	35.05	
<i>C. elegans</i> .....	80°—38°	1.2	35.11	
<i>Krohnia hamata</i> .....	80°—54°	10.5	34.50	Antarctic.
<i>Sagitta arctica</i> .....	81°—42°	7.8	35.38	
<i>Beroe cucumis</i> .....	78°—40°	1.5	33.68	Circumpolar?
<i>Pleurobrachia pileus</i> .....	82°—50°(32)	—	—	
<i>Bolina septentrionalis</i> .....	79°—40°	—	—	Circumpolar?
<i>Mertensia ovum</i> .....	80°—42°	—	—	Circumpolar.
<i>Codonium princeps</i> .....	80°—64°	—	—	
<i>Cyanea arctica</i> .....	74°—41°	—	—	Circumpolar.
<i>Pectyllis arctica</i> .....	82°—51°	—	—	
<i>Aglantha digitale</i> .....	78°—42°	9.7	35.43	Circumpolar.
<i>Cyttarocyliis denticulata</i> .....	80°—37°	8.8	34.74	Bering Sea.
<i>C. norvegica</i> .....	81°—40°	5.6	34.22	
<i>Ptychocyliis acuta</i> .....	78°—40°	9.0	34.51	
<i>Tintinnus acuminatus</i> .....	80°—37°	9.8	34.03	
<i>Actinomma boreale</i> .....	80°—48°	9.4	35.29	
<i>Anthocyrthium anthemis</i> .....	63°	6.7	35.10	North P?
<i>Aulacantha lævissima</i> .....	78°—60°	—	—	
<i>Beroetta melo</i> .....	78°	—	—	
<i>Botryopyle setosa</i> .....	78°—45°	—	—	
<i>Challengeria Harstonii</i> .....	80°—76°	—	—	North P.
<i>C. tridens</i> .....	80°—52°	—	—	
<i>Challengeron Channeri</i> .....	48°	—	—	North P.
<i>C. Nathorstii</i> .....	80°—56°	—	—	
<i>Dictyophimus gracilipes</i> .....	80°—45°	—	—	North P.
<i>Euphysetta Lucani</i> .....	45°	—	—	
<i>Euscenium tricolpium</i> .....	78°—43°	—	—	P.
<i>Hexadoras borealis</i> .....	80°—63°	—	—	
<i>Plectophora arachnoides</i> .....	78°—40°	—	—	
<i>Theocalyptra corunta</i> .....	80°—41°	—	—	North P.
<i>Ceratium arcticum</i> .....	80°—40°(34)	8.3	33.64	North P
<i>C. longipes</i> .....	79°—39°	8.5	34.02	Bering Sea.
<i>Dinophysis Michaëlis</i> .....	80°—40°	7.3	34.44	
<i>D. Vanhöffenii</i> .....	81°—52°	5.9	34.35	North P.
<i>Peridinium depressum</i> .....	81°—36°	8.2	34.33	Bering Sea.
<i>P. ovatum</i> .....	80°—40°	6.4	34.06	

	Limits Lat. N.	Mean tem- perature	Mean salinity	Distribution outside the Atlantic
<i>P. pallidum</i> .....	79°—51°	8.5	34.87	
<i>P. pellucidum</i> .....	81°—40°	5.1	34.82	
<i>Phæocystis Pouchetii</i> .....	81°—40°	5.8	34.84	
<i>Asteromphalus Hookeri</i> .....	80°—40°	5.0	34.49	Antarctic.
<i>Chætoceros atlanticus</i> .....	81°—37°	5.1	34.69	Bering Sea, Antarc.
<i>C. borealis</i> .....	80°—39°	4.3	34.86	Antarctic.
var. <i>Brightwellii</i> .....	76°—41°	8.6	35.00	
<i>C. criophilus</i> .....	80°—40° (23)	6.2	34.23	Antarctic.
<i>C. decipiens</i> .....	81°—40° (32)	7.6	34.50	North P.
<i>C. teres</i> .....	81°—42°	5.8	34.48	
<i>Coscinodiscus oculus iridis</i> ...	80°—40° (6)	6.7	34.40	Bering Sea.
<i>Leptocylindrus danicus</i> .....	81°—58° (44)	7.0	34.62	M.
<i>Nitzschia seriata</i> .....	81°—40°	8.8	35.14	M?
<i>Rhizosolenia hebetata</i> .....	77°—45°	7.8	34.88	Bering Sea.
<i>R. obtusa</i> .....	80°—41°	6.2	34.95	
<i>R. semispina</i> .....	80°—33°	7.0	34.77	
<i>Thalassiosira gravida</i> .....	80°—40°	2.7	34.08	
<i>Thalassiothrix longissima</i> .....	77°—21°	9.6	34.48	Bering Sea.

It appears from this list, that most of the species have been found as far north as 80°, several also, by the NANSEN Expedition, at 85° in the Polar Basin. Some of these species are circumpolar, i. e. have been found in the Bering Sea and in the N. Pacific. It thus seems as if the Northern Atlantic occasionally receives some currents from the Polar Basin and ultimately from the Northern Pacific. The currents may vary in different years, at least the following facts point to such a conclusion. *Rhizosolenia hebetata* was found in the Northern Atlantic in 1898, but not in 1899. This species occurs in the Bering Sea. A number of Radiolaria, not noted in the warmer Atlantic but certainly from the Pacific, were also found in 1898, but not in 1899, in the Northern Atlantic and W. of Norway. The copepod *Oncaea conifera*, which occurs in the Pacific, was collected by NANSEN at the New Siberian Islands, in hauls from 50 metre. The same animal occurred in many samples, collected in 1899 by the Nathorst Expedition to Greenland, but I have seen it but once in the temperate Atlantic at the Azores, and then very sparingly. It was on the other hand not found in any

of the numerous samples collected in 1898 by the NATHORST Expedition to Spitzbergen. This species is »arctic» in the Atlantic only.

The temperature of the water containing Tricho-plankton varied from 0° to 10° and the salinity varied as a rule between 34 and 35 p. m.

The route taken by the Tricho-plankton at the surface is from the entrance to the Polar Basin, between Spitzbergen and Greenland, along the east coast of Greenland towards Iceland. There it forks, one branch going to E. Greenland, where it follows the current round Cape Farewell, thence continuing along the western coast to Disco. The same kind of plankton prevails in the Labrador current and follows the east coast of N. America to about New York. The other branch goes from Iceland above the submarine ridge to the Färões, the Shetlands and Western Norway. The bulk of the arctic plankton that appears regularly in February in the Skagerak probably gets there through the Norwegian depression and by means of an undercurrent. A part of the arctic plankton goes towards Scotland and enters the North Sea, whence it proceeds to the continental coast.

The distribution of the Tricho-plankton in the Atlantic varies according to the seasons. In the winter (from November) this kind of plankton extends, more or less intermingled with other kinds, from the Newfoundland Banks to the Azores, to the coasts of the Spanish Peninsula and to the western mouth of the English Channel. In the early spring the arctic plankton disappears more or less completely. The Atlantic waters that contain arctic plankton become mixed with water of higher salinity and drift in the spring northwards, towards Iceland and the Färøe Channel. Such water has a salinity of about 35 p. m. and contains *Chaeto-plankton* in abundance. This kind of plankton is thus nothing but Tricho-plankton carried into water of 35 p. m. salinity wherein *Chaetoceros decipiens* multiplies, but most of the other species of the Tricho-plankton die sooner or later. It drifts during the summer towards Spitzbergen.

The sudden appearance in the winter of arctic plankton over the whole northern Atlantic cannot be accounted for by surface currents, so it may be admitted that the cold southgoing current along the American coast continues during the summer as an undercurrent towards Europe, ascending to the surface from November onwards.

The Arctic coast-regions are characterized by a number of more or less brackish forms, which together constitute the *Arctic neritic*

*plankton-type, Ng.* This kind forms a good deal of the *Sira-plankton* of the Skagerak. The mean temperature of the water containing this kind of plankton is, as a rule, low, —  $0.5^{\circ}$  to  $8.9^{\circ}$ , and the salinity is usually considerably below 34 p. m.

The following list contains the species of this kind of plankton:

### Arctic neritic species. *Ng.*

	Limits Lat. N.	Mean tem- perature	Mean salinity	Outside the Atlantic
<i>Clione limacina</i> .....	$82^{\circ}$ — $42^{\circ}$	3.3	31.97	Circumpolar.
<i>Limacina helicina</i> .....	$81^{\circ}$ — $58^{\circ}$ (35)	4.2	30.25	Circumpolar.
<i>Acartia longiremis</i> .....	$80^{\circ}$ — $58^{\circ}$	7.8	33.99	New Siberian Islands. B.
<i>Pseudocalanus elongatus</i> ...	$79^{\circ}$ — $40^{\circ}$	8.9	34.53	New Siberian Islands. B.
<i>Amphorella vitrea</i> .....	$80^{\circ}$ — $70^{\circ}$	—0.3	25.36	
<i>Fungella arctica</i> .....	$80^{\circ}$ — $50^{\circ}$	3.5	33.59	
<i>Ptychocyclus arctica</i> .....	$75^{\circ}$ — $37^{\circ}$	6.0	32.58	
<i>P. obtusa</i> .....	$81^{\circ}$ — $42^{\circ}$	3.5	33.39	
<i>Tintinnopsis karajacensis</i> ...	$81^{\circ}$ — $69^{\circ}$	2.7	32.45	
<i>Tintinnus bottnicus</i> .....	$81^{\circ}$ — $80^{\circ}$	2.7	33.83	B.
<i>Ceratium hyperboreum</i> .....	$81^{\circ}$ — $80^{\circ}$	2.1	29.65	
<i>Peridinium catenatum</i> .....	$80^{\circ}$ — $73^{\circ}$	3.2	34.55	B.
<i>Dinobryum pellucidum</i> .....	$81^{\circ}$ — $68^{\circ}$	1.9	32.94	B.
<i>Achnanthes tæniata</i> .....	$80^{\circ}$ — $57^{\circ}$	—0.3	34.29	B.
<i>Amphiprora hyperborea</i> ...	$80^{\circ}$ — $74^{\circ}$	—0.4	32.35	
<i>Chætoceros bottnicus</i> .....	$80^{\circ}$ — $72^{\circ}$	—0.4	29.95	B.
<i>C. diadema</i> .....	$80^{\circ}$ — $40^{\circ}$ (6)	6.0	33.01	North P.
<i>C. furcellatus</i> .....	$80^{\circ}$ — $59^{\circ}$ (50)	4.5	34.03	North P.
<i>C. socialis</i> .....	$74^{\circ}$ — $50^{\circ}$	4.5	33.33	North P.
<i>Eucampia grönlandica</i> .....	$78^{\circ}$ — $57^{\circ}$	—0.2	32.10	
<i>Fragilaria oceanica</i> .....	$80^{\circ}$ — $63^{\circ}$	—0.3	33.91	
<i>Lauderia fragilis</i> .....	$80^{\circ}$ — $59^{\circ}$	0.9	33.30	
<i>Melosira hyperborea</i> .....	$74^{\circ}$ — $75^{\circ}$	—0.5	33.10	B.
<i>Navicula septentrionalis</i> ...	$80^{\circ}$ — $69^{\circ}$	1.5	32.44	B.
<i>Nitzschia frigida</i> .....	$80^{\circ}$ — $74^{\circ}$	—0.4	29.95	B.
<i>Thalassiosira hyalina</i> .....	$80^{\circ}$ — $63^{\circ}$	1.8	34.59	
<i>T. Nordenskiöldii</i> .....	$80^{\circ}$ — $40^{\circ}$	7.3	34.53	North P.



It is remarkable that many of these species are also Baltic and not a few circumpolar.

I distinguish as a particular class a number of plankton forms which are not strictly arctic, but *boreal*, and occur off Iceland and the Färöes, in the Irminger Sea and in the E. Greenland Current. The mean temperature of the water in which these forms occur is as a rule higher than for the strictly arctic species. A number of these forms constitute what I have called *Northern neritic plankton*, others fall under the *Sira-plankton*. It is remarkable that such a considerable percentage of these forms occur in the northern Pacific. There are also among these forms some Baltic species.

The following list contains such boreal forms:

### Boreal species. *Ns.*

	Limits Lat. N.	Mean tem- perature	Mean salinity	Outside the Atlantic
<i>Limacina retroversa</i> .....	71°—41°	7.9	35.12	Antarctic.
<i>Arachnactis albida</i> .....	62°—56°	12.1	35.37	
<i>Anomalocera Patersonii</i> .....	73°—50°	11.5	34.17	
<i>Centropages hamatus</i> .....	70°—50°	9.7	33.58	B.
<i>Metridia hibernica</i> .....	69°—42°	11.1	35.25	
<i>Temora longicornis</i> .....	70°—40°	10.8	34.16	B.
<i>Amphorella subulata</i> .....	65°—40°	15.0		M. B. W
<i>Codonella ventricosa</i> .....	66°—36°	11.8	35.15	M.
<i>Tintinnopsis beroidea</i> .....	63°—34°	16.5	34.07	
<i>Dinophysis acuta</i> .....	73°—42°	9.5	35.03	North P.
<i>Gonyaulax spinifera</i> .....	65°—34°	8.5	34.80	M.?
<i>Hexasterias problematica</i> .....	66°—51°	7.4	34.84	
<i>Asterionella japonica</i> .....	63°—50°	8.6	34.69	North P., Ant.
<i>Biddulphia aurita</i> .....	75°—52°	4.4	34.55	North P., Ant.
<i>Chaetoceros cinctus</i> .....	65°—60°	9.1	35.09	North P.
<i>C. constrictus</i> .....	63°—39°	8.6	34.02	North P.
<i>C. debilis</i> .....	74°—40°	7.6	34.65	North P.
<i>C. hiemalis</i> .....	76°—45°	8.4	33.95	
<i>C. laciniosus</i> .....	70°—43°	8.1	33.27	North P.
<i>C. scolopendra</i> .....	66°—40° (21°)	9.5	34.66	North P., Ant.
<i>Coscinodiscus concinnus</i> .....	69°—40° (7°)	7.4	34.70	
<i>C. excentricus</i> .....	64°—32° (21°)	9.9	35.33	

	Limits Lat. N.	Mean tem- perature	Mean salinity	Outside the Atlantic
<i>C. polychordus</i> .....	72°—50°	5.1	34.85	
<i>C. radiatus</i> .....	74°—20°	7.4	34.84	
<i>Nitzschia delicatissima</i> .....	65°—57°	8.6	34.98	Antarctic.
<i>Skeletonema costatum</i> .....	63°—37°	11.8	34.10	North P.B.
<i>Thalassiosira gelatinosa</i> .....	69°—50°	7.0	26.51	North P.
<i>Thalassiothrix Frauenfeldii</i> .....	63°—21°	10.1	34.24	

II. **Styli-plankton.** This kind constitutes the plankton of the water with 35 p. m. salinity, or the »Gulf-stream water» of the hydrographers. The range of distribution of this kind is West of S. Africa, or the Benguela current, the Gulf of Guinea, the Cape Verde region and the space between the Canaries, the Azores and the mouth of the English Channel. From March to May this area expands westwards, across the whole Atlantic, between 40° and 50° N., so it seems as if the water containing this kind of plankton ascended from deeper layers to the surface. Many of the species of the Styli-plankton also occur more or less intermingled with Desmo-plankton in the western Atlantic, so that the Styli-plankton surrounds the region of the Sargasso Sea in the form of an irregular ring.

The water between 40° and 50° N., containing Styli-plankton advances northwards towards Iceland and the Färøe Channel and finally moves towards Spitzbergen. During the summer, especially in August, the water between 40° and 50° N., that contains Styli-plankton, becomes covered by a sheet of water containing Desmo-plankton. This is particularly the case in the western regions, along the American coast and above the Newfoundland Banks. Some specimens of the Desmo-plankton, more or less intermingled with the Styli-plankton, drift towards Iceland and the Färøe Channel, but in November the water with Desmo-plankton disappears from the area between 40° and 50° N., and then a number of Styli-plankton forms reappear, more or less intermingled with Tricho-plankton.

The Styli-plankton is very rich in species. I give the following list of the more important ones:

Styli-plankton. (Temperate oceanic species.) *T.*

	Limits	Mean tem- perature	Mean salinity	Outside the Atlantic
<i>Evadne Nordmannii</i> .....	0° S.—73° N.	9.7	34.49	B.
<i>E. spinifera</i> .....	35° S.—59° N.	20.7	35.39	P. I.
<i>E. tergestina</i> .....	6° N.—29° N.	25.0	36.05	M. I.
<i>Acartia Clausii</i> .....	38° N.—73° N.	11.4	35.20	M.
<i>A. Danæ</i> .....	34° N.—49° N.	17.6	35.97	P.
<i>Centropages typicus</i> .....	6° S.—63° N.	15.7	34.24	M.
<i>Clausocalanus arcuicornis</i>	33° S.—55° N.	17.5	35.89	M. R. P.
<i>Corycæus rostratus</i> .....	33° S.—48° N.	19.6	35.98	M.
<i>Eucalanus elongatus</i> .....	36° N.—60° N.	17.4	36.54	M. P.
<i>Euchirella rostrata</i> .....	32° N.—44° N.	16.2	35.93	M.
<i>Mecynocera Clausii</i> .....	30° S.—50° N.	16.8	35.77	M. P.
<i>Microsetella atlantica</i> .....	31° S.—79° N.	19.0	35.50	M. R. I. P.
<i>Oithona similis</i> .....	33° S.—81° N.	12.3	35.00	M. Bering Sea.
<i>Oncæa subtilis</i> .....	32° S.—47° N.	13.0	35.66	M.
<i>Paracalanus parvus</i> .....	32° S.—61° N.	15.9	34.88	M. R. P. I.
<i>Pleuromma abdominale</i> ...	16° N.—50° N.	13.7	35.17	M. P. I.
<i>P. gracile</i> .....	33° N.—50° N.	15.6	35.69	M. P. I.
<i>Rhinocalanus nasutus</i> ...	21° N.—60° N.	15.5	35.61	M. P.
<i>Sagitta bipunctata</i> .....	35° S.—60° N.	19.4	35.02	
<i>Amphorella amphora</i> .....	20° S.—60° N.	16.3	35.50	M.
<i>A. ganymedes</i> .....	20° S.—50° N.	16.0	35.35	M.
<i>A. Steenstrupii</i> .....	20° S.—72° N.	16.99	35.11	M.
<i>Codonella ampulla</i> .....	25° S.—51° N.	16.39	35.83	M.
<i>C. pusilla</i> .....	40° N.—51° N.	11.5	35.38	
<i>Cyttarocyclus Trefortii</i> .....	25° S.—56° N.	17.45	35.45	M.
<i>Dictyocysta elegans</i> .....	25° S.—63° N.	13.2	35.38	M. R. I.
<i>D. mitra</i> .....	20° S.—53° N.	17.8	35.51	
<i>Tintinnus Fraknoi</i> .....	26° S.—50° N.	20.7	35.82	M. R. I.
<i>T. lusus undæ</i> .....	45° N.—63° N.	11.0	35.33	M.
<i>Undella caudata</i> .....	15° S.—63° N.	14.7	35.48	
<i>U. heros</i> .....	30° N.—51° N.	17.9	35.86	
<i>U. hyalina</i> .....	34° N.—40° N.	18.15	36.45	M.
<i>U. urceolata</i> .....	45° N.—57° N.	11.9	35.19	
<i>Acanthochiasma fusiforme</i>	5° S.—66° N.	14.3	35.79	M. P.

	Limits	Mean tem- perature	Mean salinity	Outside the Atlantic
<i>Acanthochiasma Krohnii</i>	17° S.—56°(72°) N.	18.6	35.79	M. I. P.
<i>Acanthometron quadri-</i> <i>folium</i> .....	25° S.—78° N.	14.8	35.20	M.
<i>A. pellucidum</i> (incl. <i>A.</i> <i>elasticum</i> ).....	26° S.—50°(67°) N.	21.1	35.85	M. I. P.
<i>Acanthonia cuspidata</i> .....	33° S.—57° N.	20.1	35.82	M. P.
<i>A. Mülleri</i> .....	5° S.—76° N.	12.9	35.87	M.
<i>Challengeria xiphodon</i> ...	15° N.—66° N.	14.9	35.61	
<i>Collozoum inerme</i> .....	21° S.—72° N.	16.7	35.74	
<i>Litholophus ligurinus</i> .....	21° S.—79° N.	16.2	35.69	M. P
<i>Globigerina bulloides</i> .....	25° S.—81° N.	17.6	35.61	
<i>Halosphæra viridis</i> .....	26° S.—67° N.	14.6	35.78	M. I.
<i>Ceratum arietinum</i> .....	4° N.—56° N.	19.0	35.85	I.
<i>C. bucephalum</i> .....	7° N.—76° N.	15.3	35.60	
<i>C. furca</i> .....	29° S.—76° N.	13.1	35.12	R. I. P.
<i>C. fusus</i> .....	26° S.—77° N.	10.9	34.64	
<i>G. lineatum</i> .....	26° S.—77° N.	19.8	35.43	P. I. P.
<i>C. macroceros</i> .....	25° S.—77° N.	12.3	34.18	
<i>C. platycorne</i> .....	34° N.—56° N.	14.3	36.19	
<i>C. reticulatum</i> .....	21° S.—50(62°) N.	19.4	36.45	M. I.
<i>C. tripos</i> .....	35° S.—78° N.	11.4	34.92	
<i>Dinophysis hastata</i> .....	11° S.—62° N.	17.6	35.71	I.
<i>D. homunculus</i> .....	35° S.—63° N.	18.5	35.54	M. I. P.
<i>Diplopsalis lenticula</i> .....	11° S.—63° N.	16.9	35.67	M. I. P.
<i>Gonyaulax polygramma</i> ...	26° S.—61° N.	17.4	35.70	M. I. P.
<i>Oxytoxum scolopax</i> .....	20° S.—50° N.	18.7	35.69	M. I. P.
<i>Peridinium divergens</i> .....	20° S.—78° N.	15.4	35.87	M. I. R.
<i>P. globulus</i> .....	15° S.—65° N.	20.8	35.53	R.
<i>P. Michaëlis</i> .....	20° S.—80° N.	16.3	35.59	
<i>P. oceanicum</i> .....	7° N.—65° N.	12.9	35.45	R. I.
<i>P. pedunculatum</i> .....	23° N.—60° N.	14.2	35.42	M.
<i>Asteromphalus heptactis</i>	26° S.—63° N.	13.6	35.85	
<i>Bacteriastrium delicatulum</i>	17° N.—65° N.	14.7	35.22	R.
<i>B. elongatum</i> .....	7° N.—63° N.	16.8	34.91	M. I.
<i>Chætoceros furca</i> .....	6° N.—49° N.	18.1	35.78	M. R. I.
<i>C. Lorenzianus</i> .....	6° N.—50° N.	19.4	35.72	M. R. I.
<i>C. skeleton</i> .....	1° S.—65° N.	15.4	35.61	I.

	Limits	Mean tempe- rature	Mean salinity	Outside the Atlantic
<i>Chaetoceros volans</i> .....	4° S.—77° N.	14.1	35.09	
<i>Corethron hystrix</i> .....	7° N.—76° N.	10.4	35.12	North P.
<i>Coscinodiscus sol</i> .....	32° S.—57° N.	15.5	35.80	M. R. P.
<i>Dactyliosolen antarcticus</i>	35° N.—62° N.	11.7	35.37	Antarctic.
<i>D. hyalinus</i> .....	32° N.—47° N.	14.4	35.00	
<i>Hemidiscus cuneiformis</i> ...	29° S.—66° N.	20.3	35.56	M. I.
<i>Navicula membranacea</i> ...	21° N.—43° N.	15.2	35.47	R. I. P.
<i>Rhizosolenia alata</i> .....	30° S.—66° N.	11.9	35.39	M. I. P.
<i>R. corpulenta</i> .....	5° S.—64° N.	15.7	35.36	North P.
<i>R. styliiformis</i> .....	26° S.—80° N.	12.0	34.79	M. P.

It will be seen that many have a very wide range of distribution, several from the Cape of Good Hope to Spitzbergen. Many occur in the Mediterranean, some in the Pacific, and some in the Indian Ocean. Among these species there is also one Baltic species, *Evadne Nordmannii*, which I should have placed among the boreal species, had it not, according to HANSEN'S statement, been found in the Gulf of Guinea.

A certain number of species, which occur usually in the coast-regions of the temperate Atlantic, form a kind of plankton that is related to the Styli-plankton in the same way as the arctic neritic plankton to the Tricho-plankton. They constitute the plankton-type I have called *Didymus-plankton* or *Southern neritic plankton*.

The following list contains such forms as belong to this type.

### Didymus-plankton. (Temperate neritic species.) *Nm.*

	Limits	Mean tempe- rature	Mean salinity	Outside the Atlantic
<i>Podon intermedius</i> .....	40° N.—70° N.	12.3	35.42	B.
<i>Acartia bifilosa</i> .....	6° S.—63° N.	—	—	B.
<i>Eutерpe acutifrons</i> .....	40° S.—51° N.	—	—	M. I.
<i>Cyttarocyliis serrata</i> .....	33° S.—58° N.	—	—	
<i>Tintinnopsis campanula</i> .	9° N.—58° N.	—	—	B. M.
<i>Bacteriastrum varians</i> ...	7° N.—58° N.	—	—	
<i>Biddulphia mobilensis</i> ...	21° N.—62° N.	14.4	34.94	
<i>Cerataulina Bergonii</i> .....	7° N.—80° N.	11.3	34.88	M.

	Limits	Mean tempe- rature	Mean salinity	Outside the Atlantic
<i>Chaetoceros curvisetus</i> ..	11° N.—66° N.	14.7	34.91	
<i>C. danicus</i> .....	21° N.—58° N.	15.0	—	B. North P.
<i>C. densus</i> .....	12° N.—60° N.	13.8	35.18	M.
<i>C. didymus</i> .....	20° N.—60° N.	12.5	35.25	M. North P.
<i>C. Schütii</i> .....	35° N.—62° N.	11.5	34.98	North P.
<i>Ditylum Brightwellii</i> .....	23° N.—60° N.	10.5	34.85	North P.
<i>Eucampia zodiacus</i> .....	34° N.—60° N.	14.5	35.19	North P.
<i>Guinardia flaccida</i> .....	16° N.—63° N.	12.8	34.72	M.
<i>Lauderia annulata</i> .....	21° (7) N.—62° N.	13.3	35.12	M. I. P.
<i>Lithodesmium undulatum</i>	40° N.—55° N.	14.5	33.21	
<i>Rhizosolenia calcar avis</i> ...	5° N.—48° (58) N.	19.4	34.77	M.
<i>R. gracillima</i> .....	4° S.—80° N.	14.1	34.78	R.
<i>R. setigera</i> .....	7° N.—41° N.	—	—	
<i>R. Shrubsolei</i> .....	18° N.—64° N.	12.6	35.01	M. R. I.
<i>R. Stolterfothii</i> .....	10° N.—64° N.	14.8	35.06	North. P.
<i>Stephanopyxis turgida</i>	5° S.—51° N.	13.7	34.83	
<i>Streptotheca thamesis</i> ...	45° N.—58° N.	10.2	35.52	

Some of these species go very far to the south, even to the Gulf of Guinea. They enter the plankton above the 200 metre plateau, west of the European Continent, and arrive in the spring and the summer through the English Channel into the south part of the North Sea. The same kind of plankton also moves west of the British Islands towards Scotland. There are some few Baltic forms among these species.

III. **Desmo-plankton.** This kind is the prevailing one in the whole of the tropical Atlantic, in the southern hemisphere between Africa and S. America and in the Equatorial Current. The average space it occupied in the northern hemisphere was to the left of a line drawn from Cape Verde to the Newfoundland Banks, but the extension of this area was very different at different seasons. In the winter the northern limit was at about 35° N., but in May it had advanced beyond 40°, nearly to 45° N. In November the limit had retired below 40° N., but the region had moved eastwards, so that Desmo-plankton was found in November 1898 off the Canaries and Gibraltar.

The Desmo-plankton is very rich in species, as will be seen from the following list.

### Desmo-plankton. (Tropical oceanic species.) *D.*

	Limits	Mean tempe- rature	Mean salinity	Outside the Atlantic
Lucifer Reynaudii .....	26° S.—33° N.	24.6	35.70	I. P.
Acartia negligens .....	33° S.—36° N.	22.6	36.19	M. I. R. P.
Calanus minor .....	32° S.—40° N.	20.5	36.00	M. I. P.
C. vulgaris .....	25° S.—40° N.	24.4	35.69	P. I.
Calocalanus pavo .....	6° S.—40° (56) N.	22.2	36.09	M. P. I.
Candace ethiopica .....	3° N.—40° N.	22.7	36.06	M. P.
Centropages violaceus ..	26° S.—44° N.	22.1	35.92	M. P.
Clausocalanus furcatus ..	25° S.—40° N.	23.9	35.84	M. P. I. R.
Copilia mirabilis .....	6° S.—36° N.	24.3	35.90	P. I. R.
Corycæus longicaudis ...	25° S.—45° N.	25.3	35.98	P.
C. speciosus .....	30° S.—40° (50) N.	24.3	35.95	P.
Euchæta marina .....	26° S.—30° (50) N.	24.6	35.95	M. I. P.
Miracia efferata .....	4° S.—42° N.	24.6	35.87	P.
Oithona plumifera .....	33° S.—40° (66) N.	21.8	36.04	M. R. I. P.
Oncæa media .....	33° S.—47° N.	22.2	35.78	M. R. I. P.
Paracalanus aculeatus ...	1° S.—41° N.	23.9	35.37	R. P. I.
Pontellina plumata .....	35° S.—38° N.	25.8	35.22	M. R. I. P.
Sapphirina gemma .....	36° S.—11° N.	26.2	35.22	M. P. I.
Scolecithrix Danæ .....	18° S.—34° N.	25.4	35.28	M. P.
Setella gracilis .....	37° S.—47° N.	24.5	35.69	M. P. I.
Velella spirans .....	0° S.—61° N.			
Codonella cassis .....	21° S.—45° (50) N.	19.86	36.51	I. M.
C. lagenula .....	20° S.—52° (60) N.	20.27	35.21	I. M.
Cyttarocyliis acuminata ...	29° S.—50° N.	22.6	35.95	I. M.
C. amor. ....	19° S.—50° N.	23.3	36.09	I.
C. hebe .....	26° S.—48° N.	21.2	35.53	R. I.
C. simplex .....	20° S.—56° N.	19.3	35.22	
Undella Claparedii .....	20° S.—50° N.	20.73	35.94	M. R.
Acrosphæra spinosa .....	21° S.—40° (50) N.	21.5	36.41	M.
Amphilonche belonoides.	29° S.—57° N.	19.5	35.13	M. P.
A. diodon .....	7° N.—44° N.	24.7	35.91	
A. elongta .....	26° S.—40° (50) N.	21.6	35.79	M. I. P.

	Limits	Mean tempe- rature	Mean salinity	Outside the Atlantic
<i>A. tetraptera</i> .....	24° S.—40° (56) N.	22.2	35.89	M. P
<i>Callimitra Emmæ</i> .....	14° S.—33° N.	26.8	36.42	P.
<i>Collosphæra Huxleyi</i> .....	26° S.—50° N.	22.8	35.96	
<i>Diploconus fascies</i> .....	29° S.—35° N.	23.2	36.29	M.
<i>Eucyrtidium tropezianum</i> .....	21° S.—45° N.	23.5	36.13	M.
<i>Hexalaspis heliodiscus</i> .....	24° S.—39° N.	22.8	36.15	P.
<i>Hymeniastrum Euclidis</i> .....	21° S.—41° N.	24.9	35.75	P.
<i>Lithostrobos botryocystis</i> .....	21° S.—56° N.	18.8	35.54	P.
<i>Lychnaspis Giltsehii</i> .....	21° S.—41° N.	24.7	36.06	
<i>Pterocanium prætextum</i> .....	21° S.—34° (47) N.	25.2	36.20	I. P.
<i>Quadrilonche crux</i> .....	26° S.—36° N.	25.4	36.40	
<i>Siphonosphæra cyathina</i> .....	21° S.—41° N.	22.8	36.68	
<i>S. socialis</i> .....	21° S.—43° N.	22.5	36.38	
<i>Stylodictya arachnia</i> .....	21° S.—56° N.	20.9	36.56	
<i>Tessaraspis arachnoides</i> .....	26° S.—36° N.	24.1	36.19	
<i>Theoconus zancleus</i> .....	7° N.—49° N.	24.2	35.88	M.
<i>Theopilium tricostatum</i> .....	21° S.—56° N.	22.1	35.87	P.
<i>Pulvinulina Menardi</i> .....	38° S.—11° N.	23.00	35.52	
<i>Amphisolenia palmata</i> .....	19° S.—42° N.	24.4	36.22	R. I. P.
<i>A. thrinax</i> .....	21° S.—32° N.	22.5	36.41	I. P.
<i>Ceratium arcuatum</i> .....	35° S.—50° N.	23.1	35.55	
<i>C. candelabrum</i> .....	35° S.—50° N.	22.4	35.69	M. I.
<i>C. contortum</i> .....	26° S.—44° N.	25.6	35.69	M. I. P.
<i>C. curvicone</i> .....	26° S.—45° N.	21.6	35.77	M. R. I.
<i>C. fusus v. extensa</i> .....	19° S.—50° N.	21.4	36.01	M. P.
<i>C. flagelliferum</i> .....	29° S.—45° N.	22.9	36.00	
<i>C. gravidum</i> .....	26° S.—49° N.	22.4	35.99	M. I.
<i>C. limulus</i> .....	17° S.—36° N.	20.9	36.21	
<i>C. ranipes</i> .....	10° N.—49° N.	21.2	36.11	
<i>C. volans</i> .....	26° S.—44° N.	21.9	36.19	
<i>C. vultur</i> .....	21° S.—45° N.	24.4	35.60	I.
<i>Ceratocorys horrida</i> .....	21° S.—45° (50) N.	23.5	35.78	M. I. P.
<i>Cladopyxis brachiolata</i> .....	18° S.—50° N.	22.7	35.94	
<i>Goniodoma acuminatum</i> .....	35° S.—60° N.	22.4	35.98	R. I
<i>Gonyaulax Jolliffei</i> .....	26° S.—43° N.	23.2	36.17	M.
<i>Histioneis magnifica</i> .....	29° S.—44° N.	22.8	36.12	M. R. I. P.
<i>Peridinium elegans</i> .....	21° S.—47° N.	23.8	35.84	I.



	Limits	Mean tempe- rature	Mean salinity	Outside the Atlantic
<i>Phalcroma cuneus</i> .....	3° S.—40° N.	22.7	36.49	M. I.
<i>P. doryphorum</i> .....	12° S.—57° N.	22.0	35.96	M. R. I.
<i>P. Hindmarchii</i> .....	9° N.—34° N.	24.2	36.27	
<i>P. rapa</i> .....	20° S.—42° N.	21.1	35.80	South P.
<i>P. operculatum</i> .....	17° S.—47° N.	22.4	36.23	M. R. I.
<i>Podolampas bipes</i> .....	16° S.—53° N.	23.0	35.74	M. R. I. P.
<i>P. palmipes</i> .....	20° S.—68° N.	19.2	25.69	M. R. I. P.
<i>Pyrophacus horologium</i> ..	20° S.—66° N.	23.5	35.79	M. I. P.
<i>Steiniella mitra</i> .....	7° N.—42° N.	22.2	35.82	M.
<i>Pyrocystis fusiformis</i> .....	29° S.—44° N.	21.5	35.40	
<i>P. pseudonociluca</i> .....	25° S.—40° (60) N.	23.88	35.93	R. I. P.
<i>Asterolampra marylandica</i>	9° N.—36° N.	24.4	36.19	R. I.
<i>A. rotula</i> .....	21° S.—39° N.	27.0	36.53	I.
<i>Chætoceros peruvianus</i> ..	21° S.—48° N.	21.6	36.05	M. R. I. P.
<i>C. coarctatus</i> .....	25° S.—47° N.	23.4	35.01	I.
<i>C. tetrastichon</i> .....	10° N.—46° N.	23.1	36.16	M.
<i>Climacodium biconcavum</i>	26° S.—42° N.	24.5	35.81	M. R.
<i>C. Frauenfeldianum</i> .....	12° S.—42° N.	25.4	35.21	R. I. P.
<i>Hemiaulus Hauckii</i> .....	24° S.—45° N.	23.4	36.55	M. I. P.
<i>H. Heibergii</i> .....	6° N.—26° N.	24.8	36.01	M. R. I. P.
<i>Rhizosolenia acuminata</i> ..	35° S.—40° N.	23.6	35.13	M. P.
<i>R. Castracanei</i> .....	35° S.—48° N.	20.1	35.87	M.
<i>Trichodesmium Thiebaultii</i>	26° S.—59° N.	24.5	35.46	M. I.

It appears from the above list that the animal plankton is represented by a considerable number of copepoda, tintinnodea and radiolaria. The phytoplankton is poor in diatoms, in respect to both the number of species and the number of individuals, the bulk of it being represented by *Trichodesmium*, *Pyrocystis* and various dinoflagellates.

Most of the species of the Desmo-plankton go far to the south and as a rule to 40° or 50° N. Nevertheless, some species may occasionally and as rare specimens drift together with the Styliankton still farther northwards, or to about 60° N. Most of the species of the Desmo-plankton occur besides in the Mediterranean, many of them also in the Pacific and the Indian Ocean.

The temperature of the water that contains Desmo-plankton is high, above 20°, and the salinity 36 p. m. or more.

The coast regions of the tropical Atlantic are characterized by a number of more or less brackish species, of which I give the following list:

### Tropical neritic plankton. *Nl.*

	Limits	Mean tempe- rature	Mean salinity	Outside the Atlantic
<i>Temora stylifera</i> .....	37° S.—42° N.	22.6	34.93	M. I.
<i>T. turbinata</i> .....	6° S.—18° N.	21.00	20.29	P.
<i>Asterionella notata</i> .....	18° N.—40° N.	22.8	35.57	M.
<i>Biddulphia chinensis</i> ...	7° N.—10° N.	27.0	36.01	P. I.
<i>Chætoceros</i> (didym. v.)				
<i>longicurris</i> .....	29° S.—49° N.	17.3	35.23	M. R. I.
<i>C. diversus</i> .....	29° S.—40° N.	25.1	34.84	M. R. I.
<i>C. femur</i> .....	7° N.—12° N.	26.5		
<i>Coscinodiscus nobilis</i> ...	5° S.—6° S.	26.8	27.11	
<i>Ditylum sol</i> .....	10° N.	27.2	36.01	I. P.
<i>Nitzschia pungens</i> .....	7° N.—10° N.	26.5	36.01	I. P.
<i>Rhizosolenia cylindrus</i> ...	3° N.—42° N.	25.3	34.95	
<i>R. robusta</i> .....	5° S.—50° N.	21.0	34.93	M. I. P.
<i>Skeletonema tropicum</i> ...	29° S.—10° N.	25.8	35.27	

I call the kind of plankton constituted by these species *Tropical neritic plankton* (Sign. *Nl.*) Some of the species falling under that kind have a very wide range of distribution, i. e. have been found off Australia, in the Malay Archipelago etc.

## Appendicularia.

In many samples appendicularia occurred, but their bad state of preservation and the difficulty of examining them induced me to give up attempting to identify them, with the exception of the easily recognized *Fritillaria borealis*.

### FRITILLARIA BOREALIS LOHM.

(Ergebnisse d. Plankton Expedition, D. Appendicularien pag. 49).

1898 *May*: Färöes.

*July*: 78° N. 3° W. (deep sea haul. Auriv.)

*August*: Spitzbergen; Beeren Island; area between 76° N. 12° E., 78° N. 10°—33° E. and 81° N. 23° E. (Auriv.)

*September*: 74°—76° N. 19°—13° E. (Auriv.)

1899 *March and April*: Färöes.

*May*: Färöes to 59° N. 2° E.; 50° N. 33° W.; off Newfoundland.

*June*: 67° N. 11° E. to 72° N. 18° E.

*July*: 71° N. 32° E.; 71° N. 21° W.

*September*: 74°—77° N. 18°—14° E.

**Temperature:** 3.5 to 9.9, exceptionally 22.

**Salinity:** about 34, max. 35.46, min. 32.37.

**Plankton-type.** Noted from the Strait of Magellan (LOHM.), Smiths Sound, Davis's Strait, Newfoundland, Irminger Sea, North Sea, Skagerak, Kiel (AURIVILLIUS). Gulf of Finland (LEVANDER) — *T*.

## Pteropoda.

### CLIO (CRESEIS) CONICA ESCH.

(*Pelseener*: Rep. Challeng. Pteropoda pag. 50, Pl. II f. 1.)

1898 *March*: 3° N. 16° W. common.

**Temperature:** 28.<sub>2</sub>.

**Salinity:** 34.<sub>86</sub>.

**Plankton-type.** Found in the Pacific, Mediterranean, and off Brazil. — *D.* or *Nt.*

### CLIONE LIMACINA PHIPPS.<sup>1</sup>

(G. O. Sars: *Mollusca regionis arcticæ Norvegiæ* pag. 332, Pl. XXIX fig. 4.  
*Clio borealis* Vanhöffen. Grönl. Exp. Fauna u. Flora Pl. II. fig. 6.)

1898 *July*: 58° N. 36° W.

*August*: N. of Spitzbergen.

*September*: 74° N. 19° E.

1899 *June*: 74° N. 14° W.

*July*: 71°—72° N. 21°—22° W.

*August*: 71° N. 23° W.

**Temperature:** 3.<sub>3</sub>, mean of 3 obs., max. 9.<sub>3</sub>, min. —0.<sub>5</sub>.

**Salinity:** 31.<sub>97</sub>, mean of 3 obs., max. 35.<sub>14</sub>, min. 28.<sub>01</sub>.

**Plankton-type.** This species is found in the Bering Sea (KRAUSE), off W. Greenland, from Labrador to Massachusetts Bay and in the area between Lofoten—Spitzbergen and Novaja Semlja, in the White Sea and Kara Sea, off Scotland and in the Skagerak. — *Ng.*

### LIMACINA HELICINA PHIPPS.<sup>1</sup>

(G. O. Sars *Mollusca region. arct. Norvegiæ* 1878 pag. 328, Pl. XXIX fig. 1.)

1898 *July*: 58° N. 44° W.; 78° N. 3° W.; Spitzbergen.

*August*: N. of Spitzbergen.

1899 *June*: 74° N. 14° W. (haul from 25 metres).

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<sup>1</sup> Ostenfeld's data used.

*July*: 71°—74° N. 22°—18° W., rare.

*August*: 71°—72° N. 23°—16° W., rare to common.

*September*: 71° N. 15° W., very common.

**Temperature**: 4.2, mean of 3 obs., max. 7.1, min. 1.1.

**Salinity**: 29.00 to 31.51.

**Plankton-type.** This arctic species has been found off Alaska and the Aleutian Islands, in Baffins Bay from 78° N., off Labrador, at Jan Mayen, from Spitzbergen to Northern Norway and in the White Sea. The most southern points where it has been found are, according to H. MUNTKE (Bih. till K. Sv. Vet. Akad. Handl. Vol. XIII. 4. no 2 pag. 5), 38° N. 72° W. and 35° N. 43° W. — *Ng.*

### LIMACINA RETROVERSA (FLEM.)<sup>1</sup>

(*Spirialis balca*: G. O. Sars. Moll. reg. arct. Norvegiæ pag. 329 Pl. XXIX fig. 2, 3.)

1898 *February*: 45° N. 49° W.

*April*: 59° N. 33° W. to Cape Farewell and thence to 62° N. 50° W.; 43° N. 50° W. to 49° N. 31° W.

*May*: area between 58° N. 45° W., 61° N. 20° W., 59° N. 16° W. and 57° N. 34° W.

*June*: 57° N. 38° W.; Westmanna ö; 60° N. 3° W.

*July*: area between the Färöes, S. Iceland, 57° N. 47° W. and 59° N. 23° W.; 33° N. 74° W.

*August*: area between the Shetlands, S.E. Iceland and 62° N. 18° W.; 66°—62° N. 56° W.

*September*: area between the Shetlands, the Färöes, 65° N. 36° W. and 60° N. 26° W.; 59° N. 50° W. to 60° N. 55° W. and thence to 66° N. 55° W.; 71° N. 20° E.

*October*: area between the Shetlands, 64° N. 21° W. and 59° N. 21° W.; 57° N. 27° W. to 57° N. 42° W. and thence to 62° N. 56° W.

*November*: 63° N. 19° W. to 62° N. 8° W.

*December*: 64° N. 21° W. to 61° N. 6° W.; 46° N. 50° W.

1899 *January*: 41° N. 69° W.

*September*: 56° N. 30° W. common.

<sup>1</sup> Ostenfeld's data for *Spirialis* used.

**Temperature:** 7.<sub>9</sub>, mean of 48 obs., max. 14, min. 0, exceptionally 27.

**Salinity:** 35.<sub>12</sub>, mean of 40 obs., max. 35.<sub>91</sub>, min. 32.<sub>01</sub>.

**Plankton-type.** The principal area of distribution is between Greenland, Iceland and the Shetlands, whence it spreads into the Skagerak and follows the coast of Norway to Finmark. It also enters Davis's Strait and follows the southward current along the Newfoundland Banks to Massachusetts Bay. It has, according to AURIVILLIUS, been noted S. of Ireland, in the Bay of Biscay and at the Azores, but these statements are, according to PELSENEER, erroneous or doubtful. It also occurs in the southern hemisphere, round Cape Horn (H. MUNTZE) — *T*.

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## Macrura.

### LUCIFER REYNAUDII M. EDW.

(Bate: Rep. on the macroura collect. by H. M. S. »Challenger» 1888 pag. 466  
Pl. LXXXIV.)

1898 *January*: 35° N. 74° W.  
*February*: 5° S. 4°—8° E.  
*March*: 3° N. 16° W.  
*June*: 33° N. 48° W.  
*September*: 33° N. 16° W.  
*November*: 26° S. 30° W.

**Temperature**: 24.6, mean of 7 obs., max. 28.2, min. 20.9.

**Salinity**: 35.70, mean of 5 obs., max. 36.80, min. 34.

**Plankton-type**. Found in the Indian and Pacific, the S. and N. Equatorial current, Guinea current, Florida current and the Sargasso Sea — *D*.

### PONTOPHILUS NORVEGICUS M. SARS.

(Determination by G. O. Sars.)

1899 *September*: 61° N. 1° E., haul from 50 metre.

**Temperature**: 9.9.

**Salinity**: 35.45.

**Plankton-type**. This species belongs only in its young state to the oceanic plankton and occurs off the east coast of N. America, off the Norwegian coasts and in the area between Finmark and Beeren Island — *Ns.*?

## Schizopoda.

### BOREOPHAUSIA INERMIS (KRÖYER).

(Determination by G. O. Sars.)

1898 *July*: 78° N. 1° E.—3° W. (deep sea hauls. Auriv.)

*August*: 78° N. 10° E. (deep sea hauls. Auriv.)

*September*: 76° N. 15° E. (deep sea haul. Auriv.)

1899 *July*: 72° N. 22° W.; 71° N. 21° W., haul from 225 metres.

*September*: 67° N. 3° W., hauls from 300 and 167 metres; 63° N. 1° E., haul from 50 metres.

**Temperature:** 3.4, mean of 3 obs., max. 8.8, min. —0.5.

**Salinity:** 35.09, mean of 3 obs., max. 35.46, min. 34.71.

**Plankton-type.** Found along the E. coast of North America, off Greenland, Spitzbergen and Finmark (G. O. Sars) — *T*.

### CYNTHILIA THOMPSONII (M. EDW.)

(Determination by G. O. Sars.)

1899 *June*: 24° S. 6° E.

**Temperature:** 19.6.

**Salinity:** 35.71.

**Plankton-type.** Found in the N. and S. Atlantic, Pacific (G. O. Sars) — *S. or D*.

### EUPHAUSIA GRACILIS DANA.

(Determination by G. O. Sars.)

1898 *March*: 3° 30' N. 16° W.

**Temperature:** 28.2.

**Salinity:** 34.86.

**Plankton-type.** Found in the tropical Atlantic and the Pacific — *Nt?*, *D?*.



**EUPHAUSIA PELLUCIDA DANA.**

(Determination by G. O. Sars.)

1898 *Oktober*: 37°—39° N. 27°—21° W.1899 *May*: 25° S. 7° E.**Temperature**: 17.<sub>9</sub>, mean of 3 obs., max. 20, min. 14.<sub>6</sub>.**Salinity**: 36.<sub>08</sub>, mean of 3 obs., max. 36.<sub>26</sub>, min. 35.<sub>77</sub>.**Plankton-type.** According to G. O. Sars this species is »cosmopolitan» — S?**NYCTIPHANES NORVEGICUS (M. Sars.)**

(Determination by G. O. Sars.)

1899 *September*: 67° N. 3° W.; 62° N. 1° E. (deep sea hauls from 500 and 50 metres); 61° N. 1° E., hauls from 50 and 100 metres.**Temperature**: 0.<sub>6</sub>.**Salinity**: 35.<sub>10</sub>.**Plankton-type.** Found in Massachusetts Bay, off Ireland, Scotland, the Shetlands, Norway, SW. of Spitzbergen, Jan Mayen (836 metre), in the Bay of Biscay and off the coast of Portugal (AURIVILLIUS). — T.**THYSANOESSA GREGARIA G. O. Sars.**

(Determination by G. O. Sars.)

1899 *October*: 56° N. 23° W.**Temperature**: 12.**Salinity**: 35.<sub>44</sub>.**Plankton-type.** This species has a very wide range of distribution. It is known to exist in the N. Atlantic, S. and E. of Buenos Ayres, in the region between Patagonia and the Falklands Islands, S. of the Cape of Good Hope, S. Pacific, N. Pacific to Japan and in the Mediterranean. —?**THYSANOESSA LONGICAUDATA KRÖYER.**

(Determination by G. O. Sars.)

1898 *February*: 48° N. 41° W., common.*March*: 51° N. 27° W., common.*April*: 43° N. 50° W., common.*October*: 56° N. 29° W.

1899 *March*: 66° N. 22° W.

*May*: 67° N. 16° W.

*June*: 64° N. 0° E. and 67° N. 3° W., deep sea hauls, from 200 metres.

*July*: 53° N. 42° W.

*August*: 56° N. 23° W.; 52° N. 53° W.

*September*: 67° N. 3° W. (haul from 500 metres); 62° N. 1° E. (hauls from 50 and 25 metres); 56° N. 24° W.; 53° N. 51° W.

*October*: area between 56° N. 23° W., 51° N. 34° W. and 54° N. 45° W.

*November*: 51° N. 34° W.

**Temperature**: 6.0, mean of 5 obs., max. 10.2, min. 0.8.

**Salinity**: 34.84, mean of 5 obs., max. 35.46, min. 34.24.

**Plankton-type**. Found off Finmark and Greenland (G. O. Sars). NANSEN collected it in the Polar Basin, 80°—85° N. 134° to 11° E. — *T*.

#### THYSANOPODA TRICUSPIDATA M. EDW.

(Determination by G. O. Sars)

1897 *December*: 12° N. 50° W.

1898 *March*: 3° 30' N. 16° W.

**Temperature**: 26.5 and 28.2.

**Salinity**: 34.86 (one obs.).

**Plankton-type**. Found in the tropical Atlantic and the Pacific (G. O. Sars) — *Nt?* *D?*

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## Amphipoda.

### EUTHEMISTO LIBELLULA (MANDT).

(G. O. SARS: Crustacea af Norway, Amphipoda pag. 13).

- 1898 *June*: 78° N. 7° E.; 72° --76° N. 22°—26° E.  
*July*: 78° N. 1° E.—3° W. (deep sea hauls, Auriv.)  
*August*: 76°—79° N. 10'—12° E. (deep sea hauls, Auriv.)  
*September*: 56° N. 36° W.  
*November*: 40° N. 67° W.
- 1899 *May*: 75° N. 3° W.  
*June*: 66°—68° N. 2° 30'—11° W., common; 76° N. 9° E.  
*July*: 72° N. 22° W.; 73° N. 36° E.  
*August*: 73° N. 24° W., rare; 52° N. 53° W., rare.  
*September*: 70° N. 13° W.; 80° N. 13° E.

**Temperature:** 2.9, mean of 11 obs., max. 18.2, min. —1.6.

**Salinity:** 34.86, mean of 8 obs., max. 35.12 min. 34.41, exceptionally 29.57

**Plankton-type.** Found in the Siberian Polar Sea, off Spitzbergen, Jan Mayen, Greenland. NANSEN collected it at 80° N. 134° E. and at 85° N. 25°—11° E. — *T.*

### PARATHEMISTO OBLIVIA (KRÖYER).

(G. O. SARS: Crustacea of Norway, Amphipoda pag. 10).

- 1898 *February*: 45° N. 50° W.  
*June*: 69° N. 15° W.  
*July*: 78° N. 1° E. (deep sea haul).  
*August*: 54° N. 47° W.; 77°—79° N. 12°—10° E. (deep sea hauls).  
*September*: 76° N. 13° E.; 72° N. 19° E. (deep sea haul).  
*October*: Färöes.

*November*: 50° N. 44° W.; 47° N. 41° W.; 40° N. 67° W.

*December*: 45° N. 53° W.

1899 *June*: 67° N. 11° E.; 69° N. 13° W.; 71° N. 10° W.

*July*: 71° N. 10° W.; 71° N. 21° W.; 54° N. 45° W.

*September*: 69° N. 13° W.; 56° N. 23°—24° W.; 53° N. 51° W.

*October*: 56° N. 30° W. to 54° N. 45° W.

*November*: 51° N. 28° W.

**Temperature**: — 0.3 to 6.1 (exceptionally 18).

**Salinity**: 34.15, mean of 8 obs., max. 34.88, min. 32.01.

**Plankton-type.** NANSEN collected this species in the Polar Basin, between 80° N. 134° E. and 84° N. 11° E., at 85° N. 76° E. in the surface. It occurs along the coast of Norway, usually in deep water, in the Skagerak and in the Murman Sea, S. and W. of Greenland. — *T. Ng.*

### PSEUDALIBROTES LITTORALIS (KRÖYER).

(Determination by G. O. SARS.)

1899 *August*: 73° N. 24° W., rare.

**Temperature**: 2.4.

**Salinity**: 29.57.

**Plankton-type.** Found off Finmarken, Spitzbergen and Franz Josef Land, in the Kara Sea, Siberian polar Sea, off Greenland, Jan Mayen (G. O. SARS Crustacea of Norway 1890—95). — *Ng.*

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## Cladocera.

### EVADNE NORDMANNI LOVÉN.<sup>1</sup>

(Kongl. Sv. Vetensk. Akad. Handl. 1835 pag. 1, Pl. I, II.)

1898 *April*: 50° N. 3° E.

*May*: 48° N. 26° W.; English Channel; Färöes, common; Shetlands to Norway, 58°—60° N. 3°—5° E.

*June*: 48° N. 17° W.; S. of Iceland; Färöes; Scotland to the Shetlands and to Norway (62° N. 2° 30' E.).

*July*: W. and S. of Iceland; 59°—62° N. 23°—0° W.

*August*: S. of Iceland; between Iceland and the Färöes; Shetlands to the E. of Scotland.

*September*: Färöes; N. of Scotland; between Ireland and Rockall; 72° N. 19° E.

1899 *May*: 51° N. 14° W., very rare; 60° N. 3° W. to 58° N. 9° E. as a rule very common.

*June*: 51° N. 20° W., rare; 62° N. 2° E., common.

*July*: 62° N. 0° W., not common.

*August*: 72°—73° N. 26°—31° E.; 56° N. 23° W. to 55° N. 9° W., not rare.

*September*: 68° N. 6° W.; 56° N. 17° W., common.

**Temperature**: 9.7, mean of 8 obs., max. 12.8, min. 8 (only such samples considered as contained this species abundantly).

**Salinity**: 34.49, mean of 7 obs., max. 35.47, min. 31.83.

**Plankton-type**. Found in the Gulf of Guinea, the Färöe Channel and on the Newfoundland Banks (HANSEN, *Ergebn. d. Plankton Exp. G. d. pag. 9*), in the North Sea and the whole Baltic (AURIVILIUS). It seems to have the same distribution in the Eastern and Northern Atlantic as other forms of the Styli-type, advances to Iceland and through the Färöe Channel into the North Sea and towards

<sup>1</sup> Ostenfeld's data used.

the coast of Norway, whence rare specimens may drift at least to 73° N. in the Murman Sea. — *S.*

### EVADNE SPINIFERA P. E. MÜLL.

(Naturh. Tidskr. 3:dje Række Vol. V, 1868, Pl. VI, fig. 11—13.)

1898 *April*: 28° N. 47° W.

*May*: 26° N. 42° W. to 31° N. 36° W.

*June*: 29° N. 36° W.; 31°—32° N. 50°—48° W.; 31° N. 17° W.; 35° N. 20° W.; Azores; 44° N. 9° W.

*July*: Azores; 59° N. 2° E.

*August*: Azores; 49° N. 12°—14° W.; 59° N. 2° W. to 58° N. 5° E.

*September*: 18° N. 25° W.; Azores, common; 48° N. 23° W., common; 57° N. 14° W. rare.

*November*: Rio Janeiro; 24° S. 29° W. to 18° S. 31° W.

*December*: 18° N. 67° W. rare.

1899 *June*: Azores; 24° N. 42° W.

*October*: 52° N. 14° W., rare.

**Temperature**: 20.7, mean of 35 obs., max. 25, min. 10.7.

**Salinity**: 35.39, mean of 26 obs., max. 37.31, min. 30.60.

**Plankton-type**. Found in the Mediterranean and on the west coast of Australia (HANSEN) in the North Sea, the Skagerak and the Baltic. — *S. (D.)*

### EVADNE TERGESTINA CLAUS.

(Determination by W. LILLJEBORG.)

1898 *March*: 7°—11° N. 15°—19° W.; 7° N. 55° W., common.

*May*: 6°—7° N. 56°—54° W.; 29° N. 39° W.

**Temperature**: 22.2 to 27.8.

**Salinity**: 35.25 to 36.85, exceptionally 32.

**Plankton-type**. This species has been found off Sydney, Auckland, the west coast of Australia, in the Indian Ocean, the Adriatic and in the Atlantic, in the N. Equatorial Current, the Sargasso Sea and Florida Current. (Hansen: *Ergebn. d. Plankton Exp. G. d. pag. 11.*) — *D. Nt.*

**PODON INTERMEDIUS** LILLJEB.<sup>1</sup>

(P. E. MÜLL. Naturh. Tidskr. 3:dje Række, Vol. V 1868, Pl. 5 fig. 22, VI fig. 1—4.)

1898 *April*: 50° N. 3° W.

*July*: 59° N. 13° W.

*August*: 56° N. 13° W.; 61° N. 8° W. to 60° N. 3° W.; West-mannaö.

*September*: 56°—57° N. 12°—14° W.; 60° N. 4°—3° W.; 70° N. 21° E. (Auriv.)

1899 *August*: 54° N. 18° W., not rare.

*September*: 56° N. 17° W., not rare.

**Temperature**: 12.3, mean of 13 obs., max. 14.4, min. 10.2.  
(According to AURIVILLIUS 14.)

**Salinity**: in the Atlantic 35.42, mean of 11 obs. max. 35.55, min. 33.80 (in the Skagerak 21, AURIVILLIUS).

**Plankton-type**. This species is found in the Adriatic and Mediterranean, on the west coast of France, off the British Islands, the coast of Norway, in the North Sea, the Skagerak, the Baltic, at least to 63° N. (HANSEN, AURIVILLIUS). Evidently a neritic form of the eastern temperate Atlantic. — *Nm*.

**PODON POLYPHEMOIDES** LEUCK.

(P. *minutus* de GUERNE. Bull. soc. zool. de France vol. XII 1887.)

1898 *December*: 46° N. 50° W.

**Temperature**: 13—14 (AURIVILLIUS).

**Salinity**: 21 (AURIVILLIUS).

**Plankton-type**. Found off Auckland, in the Gulf of Guinea, the Mediterranean and Black Sea, off the west coast of France, in the southern North Sea, the Skagerak, the Baltic to 66° N., off Norway to Lofoten (HANSEN, AURIVILLIUS). Evidently a neritic form living on the eastern coasts of the warmer Atlantic. — *Nm*.

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<sup>1</sup> Ostenfeld's data used.

## Ostracoda.

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### CONCHOECETTA ACUMINATA CLAUS.

(CLAUS: Die Halocypriden des atlant. Oceans und Mittelmeeres. 1891. P. 67.  
Pl. XIII, XIV. Determination by J. GUNNAR ANDERSSON).

1898 *March*: 42° N. 42° W

**Temperature:** 16°

**Salinity:** 36.11.

**Plankton-type.** Found off the Canaries (surface) and Cape Finisterre (depth 1,000 metres). — S.

### CONCHOECIA BISPINOSA CLAUS.

(CLAUS: Die Halocypriden des atlant. Oceans und Mittelmeeres. 1891. P. 59.  
Pl. V. Determination by J. GUNNAR ANDERSSON).

1898 *March*: 42° N. 42° W

**Temperature:** 16°

**Salinity:** 36.11.

**Plankton-type.** Found off Madeira (surface) and at 38° N. 14° W., depth 1,500 metres. — S.

### CONCHOECIA BOREALIS G. O. SARS.

(BRADY and NORMAN. A. Monograph of the marine and freshwater Ostracoda. Part. II. 1896. P. 685—686. Pl. LXI. F. 1—8. *C. maxima*. F. 9—19. *C. borealis*. *C. maxima* Brady & Norman included. Determination by J. GUNNAR ANDERSSON).

1898 *July*: 78° N. 1° E., haul from 500 metres, not rare; 78° N. 3° W., hauls from 500 metres, not rare, from 2,600 metres, common.

*August*: 77° N. 12° E., haul from 500 metres, rare; 80° N. 10° E., haul from 500 metres, very rare.



1899 *June*: 67° N. 3° W., haul from 200 metres, rare, from 500 metres not rare.

*July*: 71° N. 21° W., haul from 200 metres, very rare.

**Temperature:** 1 to 2.5.

**Salinity:** 35.05.

**Plankton-type.** Found in deep water at 63° N. 5° E—5° W., along the coast of Norway and at Spitzbergen. NANSEN collected it in the Polar basin, between 78° N. 136° E. and 84° N. 11° E., and at 85° N. 76° E. at the surface. — *T*?

### CONCHOECIA ELEGANS G. O. SARS.

(BRADY and NORMAN. A. Monograph of the marine and freshwater Ostracoda. Part. II, 1896 pag. 684. Pl. LXV, fig. 11—22. Determination by J. GUNNAR ANDERSSON).

1898 *July*: 78° N. 3° W., rare in hauls from 2,600 and 500 metres.

*August*: 77° N. 12° E., very rare in a haul from 500 metres;

80° N. 10° E., rare in a haul from 400 metres.

1899 *June*: 67° N. 3° W., haul from 500 metres.

*July*: 74° N. 18° W., haul from 250 metres.

*September*: 67° N. 3° W., haul from 500 metres.

**Temperature:** 0.6 to 1.9.

**Salinity:** 35.10 to 35.12.

**Plankton-type.** Found in deep water in Dröbakfjord, off Lofoten, in Loch Etive (W. Scotland) and at 38° N. 14° W. (AURIVILLIUS). — *T*.

### MICROCONCHOECIA CLAUSII G. O. SARS.

(CLAUS. Die Halocypriden des atlant. Oceans und Mittelmeeres 1891 pag. 73. Pl. XX. Determination by J. GUNNAR ANDERSSON).

1898 *March*: 42° N. 42° W.

1899 *April*: 40° N. 16° W.

**Temperature:** 16° to 15°

**Salinity:** 36.11 to 36.01.

**Plankton-type.** Found in the Mediterranean and off the Canaries (450—500 metres). — *S*.

**PARACONCHOECIA OBLONGA** CLAUS.

(CLAUS: Die Halocypriden des atlant. Oceans und Mittelmeeres, 1891, pag. 63.  
Pl. VIII, F. 10—11. Pl. IX. Determination by J. GUNNAR ANDERSSON).

1898 *March*: 42° N. 42° W.

*July*: 38° N. 74° W.

**Temperature:** 24.<sub>6</sub> to 16.

**Salinity:** 36.<sub>11</sub> to 34.<sub>07</sub>.

**Plankton-type.** Found between Madeira and Portugal. — S.

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## Copepoda.<sup>1</sup>

### ACARTIA BIFILOSA GIESBR.

1898 *February*: 6° S. 12° E (mouth of the Congo), common.

**Temperature:** 26.<sub>2</sub>.

**Salinity:** 20.<sub>29</sub>.

**Plankton-type.** Noted from the North Sea, the Skagerak (salinity 30.<sub>34</sub>, temp. 1.<sub>86</sub>) and the Baltic (salinity 4). — *Nm* (and *Nt*)?

### ACARTIA CLAUSII GIESBR.

1898 *March*: Azores; 60° to 63° N. 4° to 2° E.

*April*: Azores to 49° N. 18° W. and 50° N. 3° W.; 58° N. 2° W.

*May*: 49° N. 14° W.; Färöes to Norway, 58°—64° N. 6° E.

*June*: Azores to 46° N. 24° W.; coast of Portugal to Cape Finisterre; Färöes to Norway, 62° N. 2° 30' E. to 67° N. 10° 30' E.

*July*: Azores; SW. of Ireland, 50° N. 10°—11° W.; Färöes, Shetlands.

*August*: 49° N. 20° W. to 56° N. 13°—28° W.; round Scotland to 60° N. 3° E.; S. of Iceland.

*September*: 30° N. 34° W.; Engl. Channel; 56° N. 28°—12° W., N. of Iceland; between Scotland and the Shetlands; 71° N. 20° E.

*October*: 56° N. 10°—31° W.; Färöes.

*November*: Engl. Channel; 55°—56° N. 14°—30° W., Färöes.

*December*: Färöes.

1899 *January*: Färöes.

*April*: 37° N. 9° W.

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<sup>1</sup> The only literature used, when not stated otherwise, is W. GIESBRECHT: *Systematik und Faunistik der pelagischen Copepoden des Golfes von Neapel*. Berlin 1892. 4:o.

*May*: 58' 59' N. 2' W.; 57°—58° N. 3°—9° E.

*June*: 64<sup>6</sup> N. 7' W., 62° N. 2' E.

*July*: 62' N. 0' W. to 58' N. 6' E.; 56° N. 15° W. common.

*August*: 55' N. 9° W. to 55' N. 26' W., very common.

*September*: 72' N. 19° E.; 56' N. 12'—24' W., very common.

*October*: 56' N. 15° W., very common; 52' N. 14' W., rare.

*November*: 51° N. 13° W., rare.

**Temperature**: 11.4, mean of 27 obs., max. 17.2, min. 8. (Only such samples considered as contained this species abundantly).

**Salinity**: 35.20, mean of 27 obs., max. 36.58, min. 31.62.

**Plankton-type**. Noted from the Mediterranean. The area of distribution is between the Azores, Gibraltar the Färöes and about 56° N. 30° W. Thence it drifts into the North Sea and follows the coast of Norway to about 70' or 74° N. (AURIVILLIUS). On the other hand it advances to Iceland (July), goes round that Island and was found in September at the north side. — S.

#### ACARTIA DANÆ GIESBR.

1898 *March*: 39' N. 29° W.; 43° N. 41° W.

*May*: 38° N. 21° W.

*June*: 39' N. 39° W.

*October*: Azores.

*November*: Azores, 34° N. 10' W., 49° N. 28' W.

1899 *January*: 34° N. 12° W.

*May*: 30° S. 11° E.

**Temperature**: 17.6, mean of 10 obs., max. 24, min. 12.

**Salinity**: 35.97, mean of 9 obs., max. 36.61, min. 35.32.

**Plankton-type**. Noted from the Pacific and the Cape Verde Islands. In the northern hemisphere the distribution is essentially eastern, 34°—49° N. 12°—14° W. It occurs in the Benguela current. — S.

#### ACARTIA LONGIREMIS (LILLJEB.)

1898 *May*: Färöes; 58° N. 6° E. to 64° N. 6' E.

*June* and *July*: Färöes.

*August*: Färöes; 58' N. 5' E.

*September*: Färöes; 62° N. 6° W.

*October to December*: Färöes.

1899 *January and February*: Färöes.

*March*: 66° N. 20° W.

*May*: 66° N. 22°—24° W.; round the Färöes; 58° N. 3°—9° E.

*June*: 62° N. 1° E.

**Temperature**: 7.<sub>8</sub>, mean of 16 obs., max. 12, min. 1.<sub>5</sub>.

**Salinity**: 33.<sub>99</sub>, mean of 15 obs., max. 35.<sub>27</sub>, min. 30.<sub>62</sub>.

**Plankton-type**. This species occurs in the spring N. of Iceland, towards E. Greenland, the whole year at the Färöes, along the coast of Norway, at Spitzbergen, in the North Sea, the Skagerak and in the Baltic to Åland. It was found by NANSEN at 78° N. 136° E. The above numbers for the temperature and salinity relate to the Atlantic only. It occurs in the Baltic in water of 6 p. m. salinity. — *Ns*.

#### ACARTIA MACROPUS CL.

(K. Vetensk.-Akad. Handl. Vol. XXXIV n:o 1, pag. 3. Pl. 1, fig. 1—7).

1898 *August and September*: Azores, rare.

**Temperature**: 21.<sub>2</sub> to 21.<sub>4</sub>.

**Salinity**: 36.<sub>25</sub> to 36.<sub>28</sub>.

**Plankton-type**. — *D*?

#### ACARTIA NEGLIGENS DANA.

1898 *March*: 25° N. 41° W.; 26° N. 39° W.

*April*: 27° N. 75° W.; 36° N. 74° W.

*May*: 17° N. 50° W.; 26° N. 52° W.; 32° N. 37°—36° W.

*June*: 19° N. 63° W. to 36° N. 44° W.; Azores.

*July and August*: Azores.

*September*: 15° N. 49° W.; 17° N. 48° W.; 20° N. 45° W.; 35° N. 30° W.

*October*: 26° N. 76° W.; Azores.

*November*: 19° N. 58° W.; 22° N. 53° W.; Azores.

*December*: 19° N. 58° W.

1899 *May*: 33° S. 16° E. to 25° S. 7° E.; 35° N. 75° W.

*June*: 19° S. 0° W.; 15° N. 50° W.

**Temperature:** 22.6, mean of 35 obs., max. 28, min. 17.1.

**Salinity:** 36.19, mean of 29 obs., max. 36.98, min. 35.22.

**Plankton-type.** This species is found in the Pacific and the Mediterranean. In the southern hemisphere it occurs west of S. Africa and in the northern from the Azores, across the Sargasso Sea, to the north of South America and in the Antilles and Florida currents. — *D.*

### ACARTIA TONSA DANA.

1898 *March*: 7° N. 55° W., rare.

**Temperature:** 26.6.

**Salinity:** 31.82.

**Plankton-type.** Noted from Australia (Port Jackson) and the west coast of South America, between Valparaiso and Callao — *Nt.*

### ANOMALOCERA PATERSONII TEMPLT.

1898 *May*: 61° N. 1° W.

*July*: 59° N. 2° E.

*September*: 70°—73° N. 21°—19° E. (AURIVILLIUS).

1899 *July*: 62° N. 0° E. to 58° N. 6° E.

**Temperature:** 11.5, mean of 12 obs., max. 16, min. 7.9.

**Salinity:** 34.17, mean of 12 obs., max. 35.49, min. 29.64.

**Plankton-type.** This species is not oceanic, but belongs to the coasts of the temperate Atlantic, the Engl. Channel, Scotland, the North Sea and the Skagerak, where it enters the Tripos-plankton. — *Nm. Tp.*

### CALANUS BREVICORNIS LUBBOCK.

1898 *March*: 14°—18° N. 18° W.

**Temperature:** 20 to 22.

**Plankton-type.** Noted from the Indian Ocean (east of Africa) west of the Cape of Good Hope, Gulf of Guinea and Gibraltar, and besides at Rio Janeiro. — *S? Nt?*

**CALANUS FINMARCHICUS** (GUNN.)

1898 *February*: 45° N. 50° W., very common; 50° N. 0° W.

*March*: round Iceland; Denmarks Sound; between Iceland and the Färöes; Färöes; 59° N. 1° E.; 44° N. 45° W. to 40° N. 70° W., very abundant on the whole route; N. and S. of the Azores.

*April*: 74° N. 5° W., rare; S. of Iceland to the Färöes; N. of Scotland; 49° N. 31° W. to 39° N. 74° W.; N. of the Azores to the Engl. Channel and S. of Ireland.

*May*: 71° N. 15° W. to 68° N. 17° W., rare; Vestmannaö, common; Färöes, very common; Shetlands, not abundant; coast of Norway from 58° N. 6° E. to 65° N. 9° E., rare to common; 50° N. 7° W., not rare; 49° N. 11° W.; 48° N. 26°—33° W.; 46° N. 38° W. to 40° N. 72° W., on the whole very common.

*June*: Denmarks Sound; Färöes, common; Shetlands, rare to common; 62° N. 2° 30' E.; along the coast of Norway, from 60° N. to Tromsøe and E. of Spitzbergen (77° N. 27° E.), very common from 66° to 77° N.; 47° N. 33° W.; 45° N. 23° W.; 45° N. 41° W.

*July*: N. and E. of Iceland, common; S. of Iceland, rare; Färöes, rare; 62° N. 0°—1° W., not rare to common; 57°—58° N. 1°—6° E., not rare; 48° N. 6° W.; 48° N. 14° W., not rare.

*August*: N. E. and S. of Iceland, common; Färöes, not rare; NW. of the Hebrides; E. and W. of Spitzbergen, rare to common; 56° N. 34° W. to 54° N. 47° W., more or less scarce.

*September*: N. E. and S. of Iceland, common; N. of the Färöes, common; Färöes, not rare; between Tromsøe and Spitzbergen, not common; 56° N. 28° W. to 53° N. 49° W., as a rule common or very common.

*October*: Vestmannaö, rare; 59° N. 1° W., not rare; 50° N. 10° W.; 53° N. 51° W., very common.

*November*: Färöes, not common; 60° N. 1° W., rare; 51° N. 20° W., not rare; 34° N. 10° W., very rare; 29° N. 19° W., very rare; 48° N. 40° W. to 40° N. 67° W., not rare or common.

*December*: Färöes, not rare; Azores, not rare; 47° N. 45° W. to 42° N. 63° W., as a rule common.

1899 *January*: Färöes, rare; 45° N. 49° W. to 43° N. 57° W., more or less common.

*March*: N. and N.E. of Iceland, more or less common; from E. Iceland to the Färöes, rare; 44° N. 16° W., very rare; 37° N. 26° W., not rare.

*April*: Vestmannaö, very abundant; Färöes, rare; 37° N. 9° W., rare.

*May*: 66° N. 22° W., rare; 64° N. 12° W., very abundant; Färöes, very abundant; 60° N. 3° W., very abundant, thence common to 56° N. 1° W.; 58° N. 2° E., not common; 58° N. 5° E., very common;<sup>1</sup> 51° N. 20° and 26° W., rare; 50° N. 34° W. to 47° N. 50° W., extremely abundant; 41°—44° N. 17°—15° W. to 39° N. 16° W., more or less rare.

*June*: 75° N. 15° W., not rare at the surface; 74° N. 14° W., very common in a haul from 25 metres; 66°—67° N. 2°—3° W., rare at the surface; 65°—67° N. 1°—3° W., extremely abundant in hauls from 550 and 500 metres; 62°—60° N. 0°—1° E., rare to common and 62° N. 2° E., extremely abundant in the surface; 64°—62° N. 0°—1° E., extremely abundant in hauls from 100 and 450 metres; 67° N. 11° E., rare; 70° N. 20° E., not rare.

*July*: 74° N. 18° W., very common in a haul from 280 metres; 72° N. 22° W., very common in a haul from 180 metres; 71° N. 21° W., common in a haul from 260 metres; 62° N. 0° W., rare; 79° N. 53° E., rare; 56° N. 15° W., not common; 56° N. 38° W. to 51° N. 47° W. (very common at 53°—54° N. 42°—45° W.)

*August*: 73°—72° N. 27°—20° W., common; 80° N. 51° E., not rare; 55° N. 26° W., rare; 54° N. 46° W., rare; 52° N. 53° W., not rare.

*September*: 69°—70° N. 13° W., rare; 69° N. 10° W. to 65° N. 2° W., very common; 65°—62° N. 1° W.—1° E., rare; 63° N. 1° E., very common; 61° N. 1° E., common in a haul from 100 metres; 60° N. 3° E., not rare; 56° N. 12° W. to 54° N. 48° W., rare; 53° N. 51° W. to 52° N. 55° W., common.

*October*: 56° N. 38° W. to 53° N. 48° W., rare.

<sup>1</sup> It is worthy of note that it was rare above the western slope of the Wyville-ride, close to the band from Iceland to E. Scotland, where it was so extremely abundant.



*November*: 51° N. 13° W., rare; 53° N. 43° W. (rare) to 48° N. 46° W. (common) and 47° N. 51° W., (rare).

**Temperature**: 7.8, mean of 50 obs., max. 22, min. 0.2. (Only such samples considered as contained this species abundantly).

**Solinity**: 34.30, mean of 50 obs., max. 35.44, min. 32.12.

**Plankton-type**. This species has a very wide range of distribution, according to the compilation of AURIVILLIUS (Kongl. Vetensk.-Akad. Handl. Vol. XXX n. 3 pag. 69) in the *northern Pacific*, off Japan and along the coast of Asia to N. China, in the *southern Pacific*, 37°—38° S. 133°—149° E. and along the west coast of South America; in the *Indian Ocean*, at 35° S. 45° E. In the *Atlantic* it has been seen in the northern hemisphere as far south as the Canaries. It is besides found in the Mediterranean. It was collected by NANSEN in the Polar Basin between 78° N. 136° E., 85° N. 79° E. and 84° N. 11° E. According to the above statements this species is a characteristic inhabitant of the arctic regions, along the coast-banks of Greenland, Iceland, North America etc., from where it drifts by (under-) currents across the Atlantic to the coasts of Europe. In the winter the plankton of these currents comes to the surface. — *T*.

### CALANUS GRACILIS DANA.

1898 *September*: 32° N. 33° W., very rare.

**Temperature**: 25.2.

**Salinity**: 36.71.

**Plankton-type**. Noted from the Gulf of Guinea, the Canaries, the Mediterranean and central Atlantic; also from Australia and the Philippines. — *D*.

### CALANUS HYPERBOREUS KRÖYER.

1898 *June*: 71°—72° N. 21°—23° E. (Auriv.)

*July*: 78° N. 1° E.—3° W. (deep sea hauls, Auriv.)

*August*: 79° N. 10° E. (deep sea hauls, Auriv.)

*September*: 74° N. 19° E. (Auriv.)

- 1899 *June*:  $71^{\circ}$ — $75^{\circ}$  N.  $8^{\circ}$ — $15^{\circ}$  W., surface, rare;  $74^{\circ}$  N.  $14^{\circ}$  W., haul from 25 metres, common;  $67^{\circ}$  N.  $3^{\circ}$  W., common between 500 to 100 metres;  $65^{\circ}$  N.  $1^{\circ}$  W., 550—500 metres, not rare;  $64^{\circ}$  N.  $0^{\circ}$  E., 450 to 100 metres, more or less rare.  
*July*:  $74^{\circ}$  N.  $18^{\circ}$  W., haul from 280 metres, common;  $72^{\circ}$  N.  $22^{\circ}$  W., haul from 180 metres, common;  $71^{\circ}$  N.  $21^{\circ}$  W., common between 260 and 200 metres.

**Temperature:** 2, mean of 11 obs., max. 4, min. —1.

**Salinity:**  $34.98$ , mean of 11 obs., max.  $35.08$ , min.  $34.59$

**Plankton-type.** Noted from Baffin's Bay, (Greenland, Jan Mayen, Spitzbergen, Norway and the Skagarak. It was collected by NANSEN in the Polar Basin, between  $78^{\circ}$  N.  $136^{\circ}$  E.,  $85^{\circ}$  N.  $79^{\circ}$  E. and  $84^{\circ}$  N.  $11^{\circ}$  E.; also at the surface at  $84^{\circ}$  N.  $76^{\circ}$  E. — *T*.

#### CALANUS MINOR (CLAUS).

- 1898 *February*:  $5^{\circ}$  S.  $9^{\circ}$  E.;  $26^{\circ}$  N.  $74^{\circ}$  W.  
*March*:  $14^{\circ}$  N.  $18^{\circ}$  W.;  $9^{\circ}$  N.  $59^{\circ}$  W.;  $40^{\circ}$  N.  $56^{\circ}$  W.  
*May*:  $6^{\circ}$  N.  $56^{\circ}$  W.;  $41^{\circ}$  N.  $56^{\circ}$  W.  
*June*:  $24^{\circ}$ — $27^{\circ}$  N.  $58^{\circ}$ — $55^{\circ}$  W.;  $36^{\circ}$  N.  $44^{\circ}$  W.  
*August and September*: Azores.  
*October*: Azores:  $38^{\circ}$  N.  $74^{\circ}$  W.  
*November*:  $26^{\circ}$  S.  $30^{\circ}$  W.; Cape Verde Islands;  $26^{\circ}$  N.  $48^{\circ}$  W.; Azores;  $48^{\circ}$  N.  $29^{\circ}$  W.;  $42^{\circ}$  N.  $64^{\circ}$  W.  
*December*:  $34^{\circ}$  N.  $38^{\circ}$  W.; Azores.  
1899 *March*: Azores.  
*April*:  $28^{\circ}$ — $36^{\circ}$  N.  $75^{\circ}$ — $74^{\circ}$  W.  
*May*:  $32^{\circ}$  S.  $13^{\circ}$  E.;  $35^{\circ}$  N.  $75^{\circ}$  W.  
*June*:  $24^{\circ}$  N.  $42^{\circ}$  W.

**Temperature:**  $20.5$ , mean of 39 obs., max.  $27.7$ , min.  $11$ .

**Salinity:**  $36.00$ , mean of 26 obs., max.  $37.63$ , min.  $33.11$ .

**Plankton-type.** This species is found in the Mediterranean, the Indian and Pacific. It occurs in the whole tropical Atlantic from  $26^{\circ}$  S. in the eastern and  $32^{\circ}$  S. in the western Atlantic to about  $40^{\circ}$  (exceptionally  $48^{\circ}$ ) N. — *D*.

**CALANUS TENUICORNIS** DANA.

1898 *November*: area between 22° N. 53° W., 26° N. 48° W. and 32° N. 38° W.

*December*: 28° N. 47° W.; 34° N. 28° W.

1899 *March*: 30° N. 35° W.

**Temperature**: 20.<sub>3</sub>, mean of 6 obs., max. 25.<sub>4</sub>, min. 18.<sub>5</sub>.

**Salinity**: 36.<sub>94</sub>, mean of 6 obs., max. 37.<sub>43</sub>, min. 36.<sub>59</sub>.

**Plankton-type**. Noted from the Pacific, Mediterranean and Gibraltar. — *D*.

**CALANUS VULGARIS** (DANA).

1898 *February*: 5° S. 0° W.; Caribbean Sea.

*March*: 5° S. 4° W. to 23° N. 28° W.; Azores; 7° N. 55° W.

*April*: 18° N. 17° W.

*May*: 20°—23° N. 60°—56° W.; 41° N. 65° W. to 46° N. 38° W.

*June*: 10° N. 53° W.; 22° N. 60° W.

*July*: 29°—38° N. 74° W.

*August*: Caribbean Sea; 21°—34° N. 74°—73° W.; 41° N. 57°—58° W.

*September*: 8° N. 25° W.; 9° N. 53° W. to 27° N. 36° W.

*October*: Caribbean Sea; Bahamas; 38° N. 74° W.

*November*: Rio Janeiro; 0°—8° N. 31°—28° W.; Cape Verde Islands; 19°—22° N. 58°—53° W.; 32° N. 38° W.

*December*: 18° N. 67° W.

1899 *March*: 21° N. 43° W.

*April*: 32°—36° N. 75°—74° W.

*June*: 1° N. 23° W.; 12° N. 52° W.; 18° N. 47° W.

**Temperature**: 24.<sub>4</sub>, mean of 56 obs., max. 28.<sub>2</sub>, min. 9.

**Salinity**: 35.<sub>69</sub>, mean of 51 obs., max. 37.<sub>51</sub>, min. 33.<sub>81</sub>.

**Plankton-type**. Noted from the whole Pacific, between 8° S. and 20° N. According to the above statements it occurs over the whole tropical Atlantic to about 40° N., beyond which degree it goes in May — *D*.

**CALOCALANUS PAVO** (DANA).

1898 *March*: 6° S. 4° W. to 11° N. 20° W.; 26° N. 29° W.; 35° N. 28° W.; Azores; 14°—17° N. 50°—47° W.; Caribbean Sea; 28° N. 74° W.

*April*: 31° N. 74° W.

*May*: area between 11° N. 54° W. and 23° N. 45°—56° W.

*June*: area between 19° N. 63°—35° W. and 25° N. 56° W.

*July*: 24°—26° N. 54°—48° W.; 33° N. 74° W.

*August*: 22°—25° N. 74° W.; 40° N. 66° W. to 41° N. 58° W.

*September*: 23° N. 42° W.; 20°—29° N. 74° W.; 40° N. 65° W.; 30° N. 35° W.; Azores; 56° N. 12° W.

*October*: Azores.

*November*: 8° N. 28° W. to 13° N. 27° W.; 22° N. 53° W. to 26° N. 48° W.; 32° N. 38° W.; Azores; 56° N. 26° W.

*December*: 22° N. 56° W.; Azores.

1899 *January*: Canaries.

*March*: 18° N. 45° W.; 30° N. 35° W.; Azores.

*April*: 36° N. 74° W.

*June*: 12° N. 52° W.

**Temperature**: 22.8, mean of 61 obs., max. 28, min. 10.

**Salinity**: 36.09, mean of 52 obs., max. 37.51, min. 33.98.

**Plankton-type**. Noted from the Mediterranean and the Pacific.

This species occurs in the Gulf of Guinea, follows the Equatorial current into the Caribbean Sea and the Sargasso Sea, the Florida current and goes thence to the Azores and the Canaries. It proceeds in August and September beyond 40° N., and rare specimens had in September and November drifted to about 56° N. — *D*.

**CANDACE BISPINOSA** CLAUS.

1898 *July* and *August*: 38° N. 74° W.

*September*: 20° N. 45° W.

*December*: 25° N. 52° W.; 34° N. 38° W.

**Temperature**: 23.7, mean of 5 obs., max. 26.4, min. 19.3.

**Salinity**: 35.81, mean of 5 obs., max. 37.17, min. 33.46.

**Plankton-type**. Noted from the Pacific and the Mediterranean — *D*.

**CANDACE ETHIOPICA** DANA.

1897 *December* and

1898 *January*: 12° N. 50° W.; 32° N. 33° W.; Azores.

*March*: 3° N. 16° W. to Cape Verde Islands; 9° N. 59° W. to 15° N. 49° W.; 25° N. 41° W.

*April*: Caribbean Sea.

*June*: 10° N. 53° W.

*August*: 34° N. 73° W.; Azores.

*September*: Azores.

*December*: 28° N. 47° W.; 36° N. 34° W. to 40° N. 23° W.

1899 *January*: 33° N. 15° W.

*February*: 34° N. 40° W.

*March*: Azores.

**Temperature**: 22.7, mean of 24 obs., max. 28.2, min. 14.

**Salinity**: 36.06, mean of 18 obs., max. 37.12, min. 34.86.

**Plankton-type**. Noted from the Pacific and the Mediterranean.

It occurs in the Atlantic in the Equatorial current, the Caribbean Sea, the Florida current and the Sargasso Sea to the Azores (August to January), in March south of the Cape Verde Islands. — *D*.

**CANDACE PACHYDACTYLA** DANA.

1898 *July*: 38° N. 74° W.

*November*: 19° N. 58° W.; 18° N. 25° W.

**Temperature**: 25.8, mean of 3 obs., max. 27.5, min. 24.6.

**Salinity**: 35.02, mean of 3 obs., max. 35.77, min. 34.07.

**Plankton-type**. Noted from the Pacific and the Mediterranean.

It occurs in the Atlantic between 18° N. and 18° S. — *D*.

**CANDACE PECTINATA** BRADY.

1898 *May*: 50° N. 11° W.

*September*: Azores.

1899 *March*: 33° N. 32° W.

**Temperature**: 17.3, mean of 3 obs., max. 21.9, min. 17.4.

**Salinity**: 36.06, mean of 3 obs., max. 36.54, min. 35.84.

**Plankton-type**. This species is noted from the Mediterranean, the Scilly Islands and Scotland. It occurs very rarely in the North Sea. — *S*.

## CENTROPAGES CHIERCHIÆ (GIESB.)

1898 *May*: 41° N. 16° W.; 43° N. 11° W.; 48° N. 25° W.

1899 *April*: 38° N. 10° W.

**Temperature**: 15, mean of 4 obs., max. 16.4, min. 13.8

**Salinity**: 35.84, mean of 4 obs., max. 36.82, min. 35.47.

**Plankton-type**. Noted from Gibraltar. According to the above statements it occurs between the Azores and Portugal. — S.

## CENTROPAGES FURCATUS (DANA).

1898 *February*: 5° S. 4° E. to 6° S. 12° W.

*April*: 10° N. 52° W.

*June*: 10° N. 53° W.

*November*: Rio Janeiro, abundant.

1899 *April*: 9° N. 59° W.

**Temperature**: 25.9, mean of 7 obs., max. 27.3, min. 22.

**Salinity**: 31.69, mean of 7 obs., max. 36.01, min. 20.29.

**Plankton-type**. Noted from Banka Straits, E. and N. Australia, the Philippines and the west of S. America, between 10° N. and 10° S. (Giesbr.) New to the Atlantic. According to the above statements it occurs in the Tropical Atlantic, both along the African and American coasts. The low salinity proves it to be a neritic form — Nt.

## CENTROPAGES HAMATUS (LILLJEB.)

1898 *March*: 41° N. 70° W.

*May*: 62° N. 2° E.

*July*: 59° N. 2° E.

*August*: Westmannaö.

*November*: 51° N. 1° W.

1899 *Januari*: Färöes.

*May*: 66° N. 24° W.; 58° N. 2° W.—4° E.

*July*: 58° N. 0°—6° E.

**Temperature**: 9.7, mean of 10 obs., max. 16, min. 4.4.

**Salinity**: 33.58, mean of 10 obs., max. 35.27, min. 29.64.

**Plankton-type.** This species is found on the coasts all around the British Islands, the Engl. Channel, the North Sea and the Skagerrak, the Baltic (at least to the N. of Gotland and the Gulf of Finland) and the coasts of Norway to 70° N. (AURIV.). It is essentially a northern neritic form, and the above means for the temperature and the salinity relate to the Atlantic only. AURIVILLIUS gives the numbers 1°—20° for the temperature and 12,<sub>13</sub> to 35,<sub>12</sub> for the salinity — *Ns.*

### CENTROPAGES TYPICUS KRÖYER.

1898 *January*: 21° N. 17° W.

*February*: 6° S. 12° E.

*March*: 21° N. 18° W. to 27° N. 16° W.; 42° N. 42° W. to 40° N. 64° W.

*April*: 41° N. 19° W.; 50° N. 3° W.

*May*: area between 40° N. 16° W., Cape Finisterre, the Engl. Channel and 48° N. 26° W.; 41° N. 54° W. to 40° N. 65° W.

*June*: area between 44° N. 16° W. (common), 48° N. 17° W. and the Engl. Channel; 60° N. 1° W.; 62° N. 2° 30' E.

*July*: 49° N. 22°—11° W.; 59° N. 2° E.; 40° N. 69° W. (common) to 38° N. 74° W.

*August*: Azores, rare; 49° N. 20°—11° W.; 56° N. 20° W.; 59° N. 2° W. to 60° N. 3° E.; 41° N. 72° W. to 38° N. 74° W., common.

*September*: Azores; 48° N. 24° W.; Engl. Channel; N. of Iceland; 60°—61° N. 3°—2° W., common.

*October*: 50° N. 10° W.; 38° N. 74° W., common.

*November*: Engl. Channel; 48° N. 41° W. to 41° N. 69° W. (common).

*December*: 44° N. 57° W.

1899 *January*: 41° N. 69° W., rare.

*April*: 37° N. 9° W., rare.

*May*: 57° N. 6° E., rare; 38° N. 74° W., very abundant.

*June*: 62° N. 2° E., very rare.

*July*: 62° N. 0° W. to 58° N. 6° E., rare to common.

*August*: 60° N. 3° E., common; 55° N. 9° W. rare; 56° N. 14° W., very common.

*September*: 56° N. 12° W., common; 56° N. 16° W., rare.

*October*: 56° N. 23° W.; 53° N. 25° W., common; 52° N. 14° W., not rare.

*November*: 51° N. 13° W., not rare.

**Temperature**: 15.7, mean of 18 obs., max. 21.4, min. 7.

**Salinity**: 34.24, mean of 18 obs., max. 36.25, min. 31.01. (Only such samples as contained this species abundantly considered).

**Plankton-type**. Noted from the Mediterranean, Cape Finisterre, the Engl. Channel, the British Islands, the North Sea, the Skagerak and the coast of Norway, at least to 63° N. According to the above statements it goes along the west coast of Africa, towards the Azores and occurs in the summer between these Islands and the coast of Europe, from where it spreads to the Engl. Channel and advances towards Iceland and the Färöe Channel. In September it reached the N. of Iceland. From the Färöe Channel it proceeds to the west of Norway (but seems not to advance there far beyond 62° N.) and into the Skagerak. It occurs abundantly, almost the whole year above the coast-banks from Newfoundland towards New York. *Centropages typicus* seems not to be a neritic form, and the low mean salinity is to be accounted for by the fact that a number of the calculated samples are taken from the region of the Newfoundland Banks. — S.

#### CENTROPAGES VIOLACEUS (CLAUS).

1898 *March*: 6° S. 4° E.; 7° N. 17° W.; 14° N. 50° W.

*April*: 34° N. 74° W.

*May*: 41° N. 16° W.; 25° N. 52° W.; 43° N. 43° W.

*June*: 36° N. 44° W.

*July*: 33° N. 74° W.

*August*: Azores; 44° N. 42° W.; 34°—38° N. 73°—74° W.

*September*: 33° N. 16° W.; 41° N. 65° W.

*October*: Azores.

*November*: 26° S. 30° W.; Azores.

*December*: Azores.

**Temperature**: 22.1, mean of 22 obs., max. 27.8, min. 15.

**Salinity**: 35.92, mean of 18 obs., max. 36.80, min. 33.46.

**Plankton-type**. Noted from the Pacific and the Mediterranean. It occurs in the tropical Atlantic, in May and August somewhat north of 40° — D.



**CHIRIDIUS ARMATUS** (BOECK.) G. O. SARS.

(*Euchaeta armata* Boeck. Determination by means of specimens kindly sent by Prof G. O. Sars).

1899 *June*: 65° N. 1° W. (500—550 metres); 67° N. 3° W. (500 metres)

*July*: 71° N. 21° W. (between 260 and 225 metres) 74° N. 18° W. (haul from 280 metres).

**Temperature**: 0.5 to —0.5.

**Salinity**: 34.71 to 35.01.

**Plankton type.** It occurs, according to G. O. Sars, on the Norwegian coasts, below 300 m. NANSEN collected it in the Polar Basin, between 80° N. 134° E., 85° N. 76° E. and 84° N. 11° E., at 85° N. 76° E. at the surface. — *T.*

**CLAUSOCALANUS ARCUICORNIS** (DANA).

1898 *January*: 33° N. 31° W. to 48° N. 6° W.

*February*: 6°—5° S. 12°—9° E.; 48° N. 41° W.

*March*: area between 32° N. 31° W., 48° N. 18° W. and 40° N. 56° W.

*April*: area between the Azores, 47° N. 8° W., 50° N. 12° W. and 49° N. 22° W.

*May*: area between 38° N. 21° W., 43° N. 11° W., 49° N. 14° W., 50° N. 20° W. and 41° N. 60° W.

*June*: area between Madeira, 44° N. 16° W., 47° N. 41° W. and 34° N. 33° W.

*July*: Azores; 49° N. 22° W.; 44° N. 39° W. to 40° N. 67° W.

*August*: Azores; 49° N. 20° W. to 41° N. 65° W.

*September*: 33° N. 31° W.; Azores; 41° N. 20° W. to 47° N. 9° W.; 48° N. 29° W. to 41°—42° N. 56° W.

*October*: Madeira; 37° N. 26° W. to 42° N. 15° W.; 56° N. 31° W.; 48° N. 38° W.

*November*: 20° N. 23° W.; 34° N. 10° W.; 36° N. 14° W.; Azores; 45° N. 7° W.; area between 51° N. 20° W., 55° N. 36° W., 53° N. 50° W. and 40° N. 67° W.

*December*: 30° N. 16° W.; Azores; 25° N. 51° W.; 34° N. 38° W.; 38° N. 39° W.; 50° N. 20° W.; 48° N. 40° W.

1899 *January*:  $32^{\circ}$  N.  $16^{\circ}$  W. to  $35^{\circ}$  N.  $9^{\circ}$  W.

*February*:  $32^{\circ}$  N.  $46^{\circ}$  W.;  $34^{\circ}$  N.  $40^{\circ}$  W.

*March*:  $30^{\circ}$  N.  $35^{\circ}$  W. to  $47^{\circ}$  N.  $8^{\circ}$  W., rare.

*April*: area between  $37^{\circ}$  N.  $10^{\circ}$  W.,  $43^{\circ}$  N.  $15^{\circ}$  W. and  $41^{\circ}$  N.  $18^{\circ}$  W., very common;  $48^{\circ}$  N.  $9^{\circ}$  W., rare.

*May*:  $50^{\circ}$  N.  $33^{\circ}$  W., rare;  $33^{\circ}$  S.  $16^{\circ}$  E. (common) to  $25^{\circ}$  S.  $7^{\circ}$  E. (rather rare)

*June*:  $20^{\circ}$  S.  $2^{\circ}$  E. to  $14^{\circ}$  S.  $7^{\circ}$  E., rare.

*October*:  $53^{\circ}$  N.  $31^{\circ}$  W.;  $49^{\circ}$  N.  $40^{\circ}$  W., rare.

*November*:  $51^{\circ}$  N.  $28^{\circ}$  W., not rare.

**Temperature**: 17.5, mean of 20 obs., max. 22.9, min. 8. (Only such samples considered as contained this species abundantly).

**Salinity**: 35.89, mean of 20 obs., max. 36.80, min. 33.88.

**Plankton-type.** This species is noted from the Pacific, along the west coast of S. America to  $53^{\circ}$  S. and from the Mediterranean. The total distribution in the Atlantic is, according to the above statements, from the west of S. Africa (Benguela current) to the Gulf of Guinea, Cape Verde, the Canaries towards Gibraltar and the Azores, between the Azores, the mouth of the English Channel and to the east of New York. The area of distribution was in March and April chiefly eastern, but in May it had advanced considerably towards the west. In October and November this area had greatly advanced to the north, above  $55^{\circ}$  N. In December and February this copepod was seen rarely on some isolated spots in the Sargasso Sea.

### CLAUSOCALANUS FURCATUS (BRADY).

1897 *December* and

1898 *January*: Azores to  $7^{\circ}$  N.  $52^{\circ}$  W.; Caribbean Sea;  $25^{\circ}$ — $35^{\circ}$  N.  $74^{\circ}$  W.

*February*:  $5^{\circ}$  S.  $9^{\circ}$  E.; Caribbean Sea to  $34^{\circ}$  N.  $73^{\circ}$  W.

*March*:  $6^{\circ}$  S.  $4^{\circ}$  W. to the Cape Verde Islands and the Azores, thence to  $7^{\circ}$ — $9^{\circ}$  N.  $55^{\circ}$ — $59^{\circ}$  W.; Caribbean Sea to  $28^{\circ}$  N.  $74^{\circ}$  W.

*April*:  $7^{\circ}$ — $12^{\circ}$  N.  $55^{\circ}$ — $51^{\circ}$  W.; Caribbean Sea to  $27^{\circ}$  N.  $75^{\circ}$  W.

*May*: area between  $32^{\circ}$  N.  $36^{\circ}$  W.,  $6^{\circ}$  N.  $56^{\circ}$  W. and  $20^{\circ}$  N.  $60^{\circ}$  W.; Caribbean Sea;  $41^{\circ}$  N.  $65^{\circ}$  W. to  $41^{\circ}$  N.  $51^{\circ}$  W.

- June*: 10° N. 53° W.; 24° N. 58° W. to 42° N. 33° W.; 23° N. 72° W.
- July*: 26° N. 48° W. to 21° N. 58° W.; Caribbean Sea; 25°—38° N. 74° W.; 41° N. 58° W.; Azores.
- August*: Caribbean Sea; 21° N. 58° W. to 38° N. 74° W.; 40° N. 66° W. to 42° N. 50° W.
- September*: 9°—12° N. 53°—51° W.; Caribbean Sea; 33°—38° N. 74° W.; 41° N. 65° W.; 46° N. 11° W. to 26° N. 39° W.; Madeira; Cape Verde Islands.
- October*: 21° S. 36° W.; Caribbean Sea; Bahamas; 30°—38° N. 74° W.; 42° N. 15° W. to 37° N. 27° W.
- November*: area between Rio Janeiro, 18° S. 31° W., 24° S. 29° W. and 26° S. 30° W.; 8° N. 28° W. to the Cape Verde Islands; 19° N. 58° W.; 29°—32° N. 43°—38° W., Azores; 36° N. 14° W.
- December*: 19° N. 58° W. to 28° N. 47° W.; Azores, Canaries.
- 1899 *January*: Canaries to 34° N. 12° W.
- February*: 34° N. 42° W.
- March*: 18° N. 45° W. to 24° N. 40° W.
- April*: 9° N. 59° W.; 32°—36° N. 75°—74° W.; 41° N. 17° W.
- May*: 33° N. 75° W.
- June*: 21° S. 3° E. to 9° N. 25° W.; 12° N. 52° W. to 27° N. 39° W.; Azores.
- July*: 11° N. 26° W.

**Temperature**: 23.<sub>9</sub>, mean of 69 obs., max. 28.<sub>2</sub>, min. 13.<sub>8</sub>.

**Salinity**: 35.<sub>84</sub>, mean of 66 obs., max. 37.<sub>63</sub>, min. 33.<sub>20</sub>.

**Plankton-type**. Noted from the Pacific and the Mediterranean. It occurs in the whole tropical Atlantic, between 25° S. and 40° N., beyond which degree of latitude it proceeds from May to August. It is one of the most common and characteristic forms of the Desmotype. — *D*.

#### CLYTEMNESTRA ROSTRATA (BRADY).

1898 *March*: 10° N. 20° W.

*August*: 42° N. 48° W.

**Temperature**: 22<sub>45</sub> to 26.

**Salinity**: 32.<sub>96</sub> (at the south-east of the Newfoundland Banks, probably anomalous)

**Plankton-type.** Ther species has been found in the Mediterranean, in the Atlantic at 5° S. 18° W., 27° S. 28° W., and 43° S. 56° W., in the Pacific, west of S. America, 3° S. 99° W., and in the Indian Ocean, 27° S. 87° E. — *D.*

#### COPILIA DENTICULATA CLAUS.

1898 *December*: Azores.

**Temperature:** 18.3

**Plankton-type.** This species is found in the Mediterranean. It was seen at the Azores in Styli- and Desmo-plankton intermingled. — *S?* *D?*

#### COPILIA MIRABILIS DANA.

1898 *February*: 21° N. 74° W.

*March*: 6° S. 4° W.; 3° N. 16° W. to 23° N. 28° W.; 36° N. 29° W.; 14° N. 50° W.

1899 *April*: 9° N. 59° W.; 36° N. 74° W.

*June*: 15° N. 50° W.

**Temperature:** 24.3 mean of 11 obs., max. 27.8, min. 17.8.

**Salinity:** 35.90, mean of 10 obs., max. 36.91, min. 35.20.

**Plankton-type.** Noted from the Indian and Pacific Oceans. — *D.*

#### COPILIA QUADRATA DANA.

1898 *April*: 31° N. 75° W.

**Temperature:** 22.4.

**Salinity:** 36.04.

**Plankton-type.** Noted from the Mediterranean and the tropical Pacific. — *S.* or *D.*

#### CORYCÆUS ELONGATUS CLAUS.

1898 *November*: Canaries; Azores; 34° N. 10° W.

*December*: Azores.

**Temperature:** 18.6, mean of 5 obs., max. 21.5, min. 17.6.

**Salinity:** 36.40 to 36.97.

**Plankton-type.** Noted from the S. of Rio Janeiro and the Mediterranean. The Atlantic samples, in which I found this species, contained both Desmo- and Styli-plankton. — *D* or *S*.

### CORYCÆUS FLACCUS GIESB.

1899 *April*: 40° N. 16° W. ((one female only).

**Temperature:** 15.

**Salinity:** 36.<sub>01</sub>.

**Plankton-type.** Noted from the Mediterranean and the tropical Pacific. — *S*.

### CORYCÆUS LONGICAUDIS DANA.

1898 *January*: 1° S.—7° N. 22° W.; 11° N. 52° W. to 18° N. 46° W.; 25°—29° N. 74° W.

*February*: 5° S. 0°—9° E.; Caribbean Sea; 21°—30° N. 74° W.

*March*: 7° S. 17° W. to 31° N. 29° W., thence to 9° N. 59° W., the Caribbean Sea and 28° N. 74° W.; 41° N. 60° W.

*April*: between 7° N. 55° W., 12° N. 51° W. and 11° N. 53° W.; Caribbean Sea; 27°—31° N. 75° W.

*May*: 6° N. 56° W. to 29° N. 39° W.; 41° N. 63° W. to 41° N. 51° W.

*June*: area between 10° N. 53° W., 19° N. 63° W., 30° N. 52° W and 29° N. 36° W.

*July*: 24° N. 54° W.; Caribbean Sea; 25°—38° N. 74° W.

*August*: Caribbean Sea; 22° N. 74° W. to 34° N. 73° W.; 41° N. 58° W. to 45° N. 43° W.

*September*: Cape Verde Islands to 8° N. 25° W.; 26° N. 40° W. to 32° N. 33° W.; 9° N. 53° W.; Caribbean Sea; 23—38° N. 74° W.; 40° N. 67° W. to 42° N. 57° W.; Azores.

*October*: 21° S. 36° W.; Caribbean Sea; 26° N. 76° W. to 34° N. 74° W.; Azores.

*November*: 26°—24° S. 30°—29° W.; 0° S. 31° W. to 20° N. 23° W.; 32° N. 38° W. to 19° N. 58° W.; 42° N. 64° W.; Azores; Canaries.

*December*: 26° S. 45° W.; 14° S. 36° W.; Caribbean Sea; area between 19° N. 58° W., 34° N. 38° W., 29° N. 36° W. and 16° N. 48° W.; Azores; Canaries.

1899 *January*: Canaries.

*February*: 32° N. 47° W.

*March*: 21°—24° N. 43°—40° W.; Azores.

*April*: 28°—36° N. 75°—74° W.

*June*: 17° S. 2° W. to 6° N. 24° W.; 12° N. 52° W. to 24° N. 42° W.; Azores.

*July*: 11° N. 26° W. to 20° N. 34° W.

**Temperature**: 25.3, mean of 59 obs., max. 28.4, min. 19.

**Salinity**: 35.98, mean of 54 obs., max. 37.68, min. 34.05.

**Plankton-type**. Noted from the tropical Pacific, west of S. America. It occurs in the whole tropical Atlantic between 25° S. and 45° N. and is one of the most common and characteristic constituents of the Desmo-plankton. — *D*.

### CORYCÆUS OBTUSUS DANA.

1898 *February*: Caribbean Sea.

*March*: 7° N. 55° W.; 7° N. 17° W.

*June*: 30° N. 52° W.

*July*: 38° N. 74° W.

*September*: Azores.

*October*: 21° S. 36° W.

*November*: Rio Janeiro; 20° N. 23° W.

*December*: Azores.

1899 *June*: 24° N. 42° W.

**Temperature**: 23.7, mean of 11 obs., max. 27.8, min. 17.2.

**Salinity**: 35.47, mean of 9 obs., max. 37.68, min. 31.82.

**Plankton-type**. Noted from the tropical Pacific and the Mediterranean. — *D*.

### CORYCÆUS OVALIS CLAUS.

1898 *January*: 18° N. 46° W.

*March*: 6° S. 4° W. to 3° N. 16° W.; 7° N. 55° W.; Azores; 32° N. 32° W.

*April*: 10° N. 52° W.; 23° N. 72° W.; 45° N. 41° W.

*May*: 7° N. 54° W.; 41° N. 65°—50° W.

*June*: 22° N. 60° W.

*August*: 42° N. 63° W.

- September*: 12° N. 27° W.; 25° N. 74° W.  
*October*: 21° S. 36° W.; 37°—39° N. 27°—21° W.; 34° N. 74° W.  
*November*: 0° S. 31° W.; 8° N. 28° W.; 17° N. 25° W.; 32° N. 38° W.; Azores.  
*December*: 28° N. 47° W.; Azores.  
 1899 *March*: Azores.  
*April*: 32°—36° N. 75°—74° W.  
**Temperature**: 21.<sub>6</sub>, mean of 35 obs., max. 28, min. 9.  
**Salinity**: 35.<sub>43</sub>, mean of 28 obs., max. 37.<sub>21</sub>, min. 28.<sub>10</sub>.  
**Plankton-type**. Noted from the Mediterranean. — *D.*

### CORYCÆUS ROSTRATUS CLAUS.

- 1898 *March*: Azores, common; 40° N. 56° W.  
*June*: Azores; 35° N. 21° W.  
*July*: round the Azores.  
*August*: Azores; 40° N. 66° W. to 45° N. 40° W.  
*September*: Cape Verde Islands; Madeira, common; Azores, common; 46° N. 39° W.  
*October*: round the Azores, common; 39° N. 21° W.  
*November*: Azores, common; 48° N. 29°—41° W.; 34°—36° N. 10°—14° W., common; 18° S. 31° W.  
*December*: Canaries; 34° N. 38° W. to 42° N. 16° W. (common at the Azores); 44° N. 57° W.  
 1899 *January*: Canaries; Madeira; Gibraltar.  
*February*: 34° N. 40° W.  
*March*: 36° N. 29° W. to 44° N. 16° W., common to rare.  
*April*: 41° N. 15°—18° W.  
*May*: 33° S. 16° E. (common) to 29° S. 9° E. (rare).  
*June*: 20° S. 2° E.; 36° N. 30° W.

**Temperature**: 19.<sub>6</sub>, mean of 18 obs., max. 28, min. 13.<sub>4</sub>.  
**Salinity**: 35.<sub>98</sub>, mean of 18 obs., max. 36.<sub>80</sub>, min. 34.<sub>33</sub>, (only such samples considered as contained this species more or less abundantly).

**Plankton-type**. Noted from the Mediterranean. According to the above statements this species enters the Atlantic west of the Cape of Good Hope, appears near St. Helena, the Cape Verde Islands

and the Canaries. The principal area of distribution in the northern Atlantic is the area between the Canaries, Gibraltar and the Azores, whence it extends, north of  $40^{\circ}$ , towards the east of New York. — S.

### CORYCÆUS SPECIOSUS DANA.

1897 *December* and

1898 *January*:  $7^{\circ}$  N.  $22^{\circ}$  W.;  $7^{\circ}$  N.  $53^{\circ}$  W. to  $16^{\circ}$  N.  $48^{\circ}$  W.;  $32^{\circ}$  N.  $33^{\circ}$  W.

*February*:  $5^{\circ}$  S.  $4^{\circ}$  E.— $9^{\circ}$  W.; Caribbean Sea.

*March*: area between  $6^{\circ}$  S.  $4^{\circ}$  W.,  $1^{\circ}$  S.  $15^{\circ}$  W. and  $11^{\circ}$  N.  $23^{\circ}$  W.; area between  $6^{\circ}$  N.  $55^{\circ}$  W.,  $10^{\circ}$  N.  $53^{\circ}$  W. and  $14^{\circ}$  N.  $50^{\circ}$  W.; Caribbean Sea;  $28^{\circ}$  N.  $74^{\circ}$  W.

*April*:  $7^{\circ}$  N.  $55^{\circ}$  W. to  $12^{\circ}$  N.  $51^{\circ}$  W.;  $27^{\circ}$  N.  $73^{\circ}$  W. to  $31^{\circ}$  N.  $75^{\circ}$  W.

*May*: area between  $6^{\circ}$  N.  $56^{\circ}$  W.,  $20^{\circ}$  N.  $60^{\circ}$  W.,  $26^{\circ}$  N.  $52^{\circ}$  W. and  $11^{\circ}$  N.  $52^{\circ}$  W.;  $41^{\circ}$  N.  $59^{\circ}$ — $56^{\circ}$  W.

*June*:  $10^{\circ}$  N.  $53^{\circ}$  W.;  $19^{\circ}$  N.  $63^{\circ}$  W.

*July*:  $24^{\circ}$  N.  $54^{\circ}$  W.;  $25^{\circ}$ — $33^{\circ}$  N.  $74^{\circ}$  W.

*August*:  $22^{\circ}$ — $38^{\circ}$  N.  $74^{\circ}$  W.;  $42^{\circ}$  N.  $62^{\circ}$ — $50^{\circ}$  W.

*September*:  $8^{\circ}$  N.  $25^{\circ}$  W. to  $18^{\circ}$  N.  $25^{\circ}$  W.;  $15^{\circ}$  N.  $49^{\circ}$  W. to  $27^{\circ}$  N.  $36^{\circ}$  W.; Caribbean Sea;  $42^{\circ}$  N.  $57^{\circ}$  W.

*October*: Caribbean Sea;  $26^{\circ}$  N.  $76^{\circ}$  W.

*November*:  $26^{\circ}$  S.  $30^{\circ}$  W.;  $8^{\circ}$  N.  $28^{\circ}$  W. to  $13^{\circ}$  N.  $27^{\circ}$  W.;  $22^{\circ}$  N.  $53^{\circ}$  W. to  $29^{\circ}$  N.  $43^{\circ}$  W.;  $40^{\circ}$  N.  $67^{\circ}$  W.;  $51^{\circ}$  N.  $20^{\circ}$  W.

*December*: Canaries; Azores to  $25^{\circ}$  N.  $52^{\circ}$  W.;  $29^{\circ}$  N.  $74^{\circ}$  W.

1899 *January*:  $33^{\circ}$  N.  $15^{\circ}$  W.

*April*:  $32^{\circ}$  N.  $74^{\circ}$  W.

*May*:  $33^{\circ}$  S.  $16^{\circ}$  E.

*June*:  $19^{\circ}$  S.  $0^{\circ}$  W. to  $1^{\circ}$  S.  $21^{\circ}$  W.;  $12^{\circ}$  N.  $52^{\circ}$  W. to  $36^{\circ}$  N.  $30^{\circ}$  W.

**Temperature**: 24.<sub>s</sub>, mean of 86 obs., max. 28.<sub>4</sub>, min. 13.<sub>s</sub>.

**Salinity**: 35.<sub>95</sub>, mean of 64 obs., max. 37.<sub>63</sub>, min. 33.<sub>20</sub>.

**Plankton-type**. Noted from the tropical Pacific, between  $10^{\circ}$  S. and  $20^{\circ}$  N., west of S. America to  $137^{\circ}$  E. It occurs in the Atlantic from about  $30^{\circ}$  S. to  $40^{\circ}$  N., but advances in May to November north of the last degree, and rare specimens may drift beyond  $50^{\circ}$  N. (November). — D.



**CORYCÆUS VENUSTUS** DANA.

1898 *January*: 21° N. 17° W.

*February*: 5° S. 4°—9° E.; 30° N. 74° W.

*March*: 4° S. 10° W.; 7° N. 17° W.; Azores; 40° N. 56° W.

*October*: Azores.

*November*: 42° N. 64° W.

*December*: Azores.

1899 *January*: Canaries.

*May*: 30° S. 11° E.

**Temperature**: 20.<sub>6</sub>, mean of 12 obs., max. 27.<sub>8</sub>, min. 11.

**Salinity**: 35.<sub>26</sub>, mean of 8 obs., max. 36.<sub>52</sub>, min. 33.<sub>93</sub>.

**Plankton-type**. Noted from the Mediterranean and the Pacific.

— *S.* or *D.*

**EUCALANUS ELONGATUS** (DANA).

1899 *April*: 33° N. 32° W., very rare.

**Temperature**: 17.<sub>4</sub>.

**Salinity**: 36.<sub>54</sub>.

**Plankton-type**. Noted from the Pacific, Gibraltar, the Mediterranean (GIESBR.), 60° N. 7° W. in August (TH. SCOTT) and the Skagerak in February (AURIVILLIUS). — *S.*

**EUCALANUS SUBCRASSUS** GIESBR.

1898 *February*: 5° S. 8° E.

*March*: 11° N. 20° W.

**Temperature**: 24.<sub>6</sub> to 27.<sub>3</sub>.

**Salinity**: 35.<sub>20</sub> to 33.<sub>93</sub>.

**Plankton-type**. Noted from the Pacific, W. of S. America. 3° S—10° N., Hongkong, Amoy, the Red Sea. — *D.* (*Nt?*).

**EUCALANUS SUBTENUIS** GIESBR.

1898 *February*: 6° S. 15° E., very rare.

**Temperature**: 26.<sub>2</sub>.

**Salinity**: 20.<sub>29</sub>.

**Plankton-type**. Noted from the western Pacific and the Cape Verde Islands. — *S?*

**EUCHÆTA MARINA** (PRESTANDREA).

1898 *January*: 7°—12° N. 50°—53° W.; Caribbean Sea; 30° N. 34° W.

*February*: Caribbean Sea.

*March*: 1° S. 15° W. to the Cape Verde Islands; area between 10° N. 53° W., 17° N. 47° W. and 14° N. 50° W.; 28° N. 74° W.

*April*: 7° N. 55° W.; 12° N. 51° W.; Caribbean Sea.

*May*: 13° N. 51° W.; 26° N. 52° W.; Caribbean Sea.

*June*: 10° N. 53° W.; 19° N. 63° W.

*August*: Caribbean Sea.

*September*: 8°—12° N. 25°—27° W.; 26° N. 36°—39° W.

*November*: 26° S. 30° W.; 8° N. 28° W.; 22° N. 53° W.; 29°—32° N. 43°—38° W.; 51° N. 20° W.

*December*: Canaries; 19° N. 58° W. to 34° N. 38° W.

1899 *March*: 33° N. 32° W.

*April*: 32°—36° N. 75°—74° W.

*May*: 38° N. 74° W.

*June*: 7° S. 14° W. to 1° S. 21° W.; 7° N. 25° W.; 12° N. 52° W.

*July*: 11° N. 26° W.

**Temperature**: 24.<sub>6</sub>, mean of 52 obs., max. 28.<sub>4</sub>, min. 9.

**Salinity**: 35.<sub>95</sub>, mean of 39 obs., max. 37.<sub>34</sub>, min. 33.<sub>28</sub>.

**Plankton-type**. Noted from the Pacific and the Mediterranean.

It occurs in the Atlantic from 26° S. (38° S. Brady) to somewhat north of 30° N., but rare specimens may drift beyond 50° N. (November). — *D*.

**EUCHÆTA NORVEGICA** BOECK.

1898 *July*: 78° N. 1° E.—3° W. (deep sea hauls, Auriv.)

*August*: 77°—78° N. 12°—10° E. (deep sea hauls, Auriv.)

*September*: 72° N. 19° E. (deep sea haul, Auriv.)

1899 *June*: 67° N. 3° W., not rare between 500 and 200 metres; 75° N. 1° W., rare between 550 and 500 metres; 64° N. 0° E., haul from 200 metres, rare; 62° N. 1° E., haul from 150 metres, rare.

*July*: 74° N. 18° W., haul from 280 metres, rare; 72° N. 21° W., haul from 260 metres, rare; 71° N. 21° W., haul from 180 metres, rare.

*September*: 67° N. 3° W., between 500 and 100 metres, not rare.

**Temperature**: 2.<sub>3</sub>, mean of 8 obs., max. 6, min. 0.<sub>1</sub>.

**Salinity**: 35.<sub>12</sub>, mean of 8 obs., max. 35.<sub>29</sub>, min. 34.<sub>97</sub>.

**Plankton-type**. Noted from deep water in Baffin's Bay, the area between Greenland, Norway and Iceland, the Färöe Channel and the Skagerak. NANSEN collected it in the Polar Basin, between 78° N. 136° E. and 84° N. 11° E., at 85° N. 76° E. at the surface. — *T*.

#### EUCHÆTA SPINOSA (GIESBR)

1898 *May*: 46° N. 38° W.; 41° N. 51° W.

*November*: 42° N. 64° W.

**Temperature**: 16.<sub>4</sub>, mean of 3 obs., max. 19, min. 14.

**Salinity**: 35.<sub>63</sub> to 36.<sub>01</sub>.

**Plankton-type**. Noted from the Mediterranean. — *S*?

#### EURICHELLA ROSTRATA (CLAUS).

1898 *March*: 45° N. 36° W.; 42° N. 42° W.; 46° N. 34° W. to 40° N. 64° W.

*October*: 44° N. 43° W.

*December*: 32° N. 16° W.

1899 *April*: 39°—40° N. 15°—16° W.

**Temperature**: 16.<sub>2</sub>, mean of 7 obs., max. 20, min. 13.

**Salinity**: 35.<sub>93</sub>, mean of 8 obs., max. 36.<sub>74</sub>, min. 35.<sub>36</sub>.

**Plankton-type**. Noted from the Mediterranean. — *S*.

#### EUTERPE ACUTIFRONS (DANA).

1898 *January*: 17° N. 21° W.; 6° N. 55° W.

*February*: 6° S. 12° E.

*March*: 7° N. 25° W.; 21° N. 17° W.; 49° N. 14° W.; 40° N. 56° W.

*June*: 40°—42° N. 10°—9° W.; 19° N. 63° W.

*August*: 41° N. 57° W.

*September*: 49° N. 3° W.; 41° N. 65° W.

*November*: 51° N. 1° W.; 42° N. 64° W.

1899 *January*: 29° N. 16° W.

*April*: 9° N. 59° W.

**Temperature:** 19.4, mean of 18 obs., max. 28, min. 11.

**Salinity:** 36.52 to 20.29.

**Plankton-type.** Noted from the Mediterranean, the North Sea and the mouth of the Rio Negro (40° S.). It is a neretic form of very wide distribution, from the mouth of the Congo to the southern North Sea and from the Rio Negro to the S. of the Newfoundland Banks. — *Nt*, *Nm*.

#### LABIDOCERA ACUTIFRONS (DANA).

1898 *March*: 11° N. 20° W.; 16° N. 18° W.

**Temperature:** 20 to 24.6.

**Salinity:** 35.20.

**Plankton-type.** Noted from the tropical Pacific, western Mediterranean and the Atlantic, 23° S. to 18° N. — *S.* (or *Nt*?)

#### LABIDOCERA NERII (KRÖYER).

1898 *March*: 6° N. 22° W.; 7° N. 17° W.

**Temperature:** 22 to 27.8.

**Salinity:** 35.25.

**Plankton-type.** Noted from the eastern Atlantic 2°—8° N. 19°—25° W., and from Cape Finisterre. — *S.* (*Nt*?).

#### LEUCKARTIA FLAVICORNIS (CLAUS).

1898 *March*: 32° N. 32° W.; Azores; 45° N. 36° W.; 40° N. 56° W.

*July*: Azores.

*August*: 22° N. 74° W.

*September*: 30° N. 35° W.

*November*: 34° N. 10° W.

*December*: 33° N. 38° W.

**Temperature:** 19.4, mean of 8 obs., max. 27.8, min. 11.

**Salinity:** 36.12, mean of 8 obs., max. 36.59, min. 34.40.

**Plankton-type.** Noted from the Canaries, the Mediterranean and the Tropical Pacific, west of America — *S.* (*D*?)

**LUBBOCKIA SQUILLIMANA** (CLAUS).

1898 *March*: 29° N. 35° W.

**Temperature**: 19<sub>4</sub>.

**Salinity**: 36.<sub>85</sub>.

**Plankton-type**. Noted from the tropical Pacific, Mediterranean and the region of Ascension. — S.?

**MECYNOCERA CLAUSII** (J. C. THOMPS).

1897 *December* and

1898 *January*: 34° N. 30° W. to 46° N. 11° W.; 23° N. 42° W.; 16° N. 48° W.; 32° N. 74° W.

*February*: 48°—50° N. 40°—31° W.; 16° N. 71° W. to 34° N. 74° W.

*March*: area between 23° N. 28° W., 28° N. 38° W. and the Azores; area between the Azores, 48° N. 6° W. and 49° N. 33° W.; 49° N. 33° W. to 40° N. 64° W.; 9° N. 53°—59° W.; 15° N. 49° W.; 32° N. 74° W.

*April*: 41° N. 19° W.; 45° N. 16° W.; 47° N. 29° W.; 47° N. 39° W.

*May*: 38° N. 21° W.; 41° N. 16° W.; 45° N. 43° W.; 43° N. 45° W.

*June*: Azores; 39° N. 39° W.; 45° N. 41° W.; 48° N. 33° W.

*July* and *August*: Azores.

*September*: 46° N. 39° W.; 43° N. 48° W.

*November*: 33° N. 10° W.; Azores; area between 51° N. 20° W., 50° N. 31° W., 40° N. 67° W. and 47° N. 41° W.

*December*: Azores; 49° N. 30° W.; 42°—43° N. 62°—57° W.

1899 *January*: 33° N. 15° W.

*March*: 30° N. 34° W. to the Azores; 46° N. 11° W.

*April*: 35° N. 74° W.

*April*: 25°—30° S. 7°—11° E.

**Temperature**: 16<sub>8</sub>, mean of 79 obs., max. 28, min. 10.

**Salinity**: 35.<sub>77</sub>, mean of 49 obs., max. 37.<sub>05</sub>, min. 32.<sub>87</sub>.

**Plankton-type**. This species is noted from the tropical Pacific, the Mediterranean and the Canaries. The distribution of this species in the Atlantic is very interesting in several respects. It is arkremable that it was so abundant in 1898 and scarce in 1899.

From the occurrence in April 1899 it appears that it enters the Atlantic west of the Cape of Good Hope. In December 1897 to February 1898 it occurred both from the Azores to the European coast, in the Caribbean Sea and in the Florida Current. In March it appeared suddenly over a very wide area round the Sargasso Sea and across the whole Atlantic, from the Engl. Channel to the east of New York. Later it decreased in abundance, but in November it reappeared over the wide area between  $40^{\circ}$  and  $50^{\circ}$  N. from  $20^{\circ}$  W. towards New York. As it is impossible to account for these sudden changes in the distribution by surface currents, the most acceptable explanation seems to be that water, containing this species (or Styliplankton) arrived in the spring by a vertical movement to the surface, but in April and May was covered by another kind of water, that remained between  $40^{\circ}$  and  $50^{\circ}$  N. to November. That other kind of water cannot be any other than water containing Desmoplankton and arrived as a surface-current from the Florida Current and the Sargasso Sea. — S.

#### METRIDIA HIBERNICA (BRADY & ROBERTS)

1898 *February*:  $50^{\circ}$  N.  $31^{\circ}$  W.;  $48^{\circ}$  N.  $41^{\circ}$  W.

*March*:  $47^{\circ}$  N.  $27^{\circ}$  W. to  $50^{\circ}$  N.  $9^{\circ}$  W.

*May*:  $42^{\circ}$  N.  $61^{\circ}$  W.

*June*:  $45^{\circ}$  N.  $41^{\circ}$  W.

*November*:  $52^{\circ}$  N.  $38^{\circ}$  W.;  $56^{\circ}$  N.  $26^{\circ}$  W.

*December*:  $50^{\circ}$  N.  $20^{\circ}$ — $9^{\circ}$  W.

1899 *March*:  $62^{\circ}$  N.  $8^{\circ}$  W.

*June*:  $62^{\circ}$  N.  $0^{\circ}$   $37'$  E., below 100 metres.

*July*:  $56^{\circ}$  N.  $15^{\circ}$  W., rare.

*September*:  $62^{\circ}$  N.  $0^{\circ}$   $40'$ — $1^{\circ}$  E.

**Temperature**: 11.1, mean of 11 obs., max. 16.3, min. 6.

**Salinity**: 35.25, mean of 10 obs., max. 36.02, min. 32.96.

**Plankton-type**. Noted from Iceland, the Färøe Channel, the North Sea, the Skagerak and the west coast of Norway, at least to  $71^{\circ}$  N. It occurs in the Atlantic usually associated with Trichoplankton. — (1.) *Ns*.

**METRIDIA LONGA** LUBBOCK.

- 1898 *June*: 77° N. 27° E. (deep sea haul Auriv.)  
*July*: 78° N. 1° E.—3° W. (deep sea hauls Auriv.)  
*August*: 77°—79° N. 12°—10° E. (deep sea hauls Auriv.)
- 1899 *June*: 67° N. 3° W., from 500 to 200 metres, common; 65° N. 1° W., between 500 and 550 metres, rare; 64° N. 0° E., haul from 450 metres, rare.  
*July*: 74° N. 18° W., haul from 280 metres, common, 72° N. 22° W., haul from 180 metres, common; 71° N. 21° W., not rare between 260 and 200 metres.  
*September*: 67° E. 3° W., rare between 500 and 167 metres; 65° N. 1° W., surface rare.

**Temperature**: 0.7, mean of 8 obs., max. 2.5, min. —1°.

**Salinity**: 34.94, mean of 8 obs., max. 35.10, min. 34.59.

**Plankton-type.** Noted from Baffin's Bay, Spitzbergen, the Färöe Channel, Norway and the Skagerak. NANSEN collected it in the Polar Basin, between 78° N. 136° E. and 84° N. 11° E., at 85° N. 76° E. at the surface — *T*.

**MICROSETELLA ATLANTICA** BRADY & ROBERTS.<sup>1</sup>

- 1898 *January*: 12° S. 34° W. to 21° N. 17° W.; 7° N. 53° W.; Caribbean Sea; 29°—35° N. 74°—75° W.  
*February*: Caribbean Sea; Bahamas to 34° N. 74° W.; 5° S. 9° E.  
*March*: 6° S. 4° W. to 23° N. 27° W. and to 25° N. 16° W.; 7° N. 54° W. to the English Channel and thence to 40° N. 56° W. (or, practically the whole Atlantic from 5° S. to 50° N.)  
*April*: 7° N. 55° W.; Caribbean Sea to 31° N. 75° W.; 49° N. 12° W. to 48° N. 5° W.; 60° N. 4°—19° W. to 63° N. 17° W.  
*May*: area between 7° N. 54° W., 16° N. 71° W. and 28° N. 74° W.; SE. of the Azores; 41° N. 65° W.; 41° N. 53° W. to 50° N. 7° W.; 59° N. 16° W. to 60° N. 4° E.; 64° N. 7° E.

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<sup>1</sup> Ostenfeld's data used.

- June*: area between  $19^{\circ}$  N.  $63^{\circ}$  W.,  $23^{\circ}$  N.  $42^{\circ}$  W. and  $36^{\circ}$  N.  $44^{\circ}$  W.;  $45^{\circ}$  N.  $41^{\circ}$  W.; Azores;  $48^{\circ}$  N.  $17^{\circ}$  W. to  $50^{\circ}$  N.  $12^{\circ}$  W.; Scotland to S. Iceland.
- July*:  $21^{\circ}$  N.  $58^{\circ}$  W. to  $26^{\circ}$  N.  $49^{\circ}$  W.;  $33^{\circ}$  N.  $74^{\circ}$  W.;  $41^{\circ}$   $58^{\circ}$  W.; Azores; area between  $58^{\circ}$  N.  $36^{\circ}$  W., S. Iceland and  $62^{\circ}$  N.  $0^{\circ}$  E. (maximum at  $60^{\circ}$  N.  $21^{\circ}$  W.)
- August*:  $25^{\circ}$  N.  $74^{\circ}$  W.;  $40^{\circ}$  N.  $66^{\circ}$  W. to  $48^{\circ}$  N.  $31^{\circ}$  W.;  $56^{\circ}$  N.  $34^{\circ}$  W.;  $49^{\circ}$  N.  $16^{\circ}$  W.; area between  $62^{\circ}$  N.  $18^{\circ}$  W.,  $61^{\circ}$  N.  $6^{\circ}$  W.,  $62^{\circ}$  N.  $10^{\circ}$  W. and S. Iceland, thence to Denmark's Sound and E. Greenland ( $65^{\circ}$  N.); S. of Spitzbergen.
- September*:  $8^{\circ}$  N.  $25^{\circ}$  W.;  $12^{\circ}$  N.  $27^{\circ}$  W.;  $15^{\circ}$  N.  $49^{\circ}$  W. to  $27^{\circ}$  N.  $36^{\circ}$  W.;  $33^{\circ}$  N.  $74^{\circ}$  W.; Canaries; S. of the Azores;  $42^{\circ}$  N.  $57^{\circ}$  W.;  $46^{\circ}$  N.  $14^{\circ}$  W.;  $47^{\circ}$  N.  $9^{\circ}$  W.; area between  $56^{\circ}$  N.  $27^{\circ}$  W.,  $65^{\circ}$  N.  $36^{\circ}$  W., N. Iceland and  $60^{\circ}$  N.  $6^{\circ}$  W.;  $70^{\circ}$  N.  $20^{\circ}$  E. to  $74^{\circ}$  N.  $17^{\circ}$  E.
- October*:  $31^{\circ}$  S.  $36^{\circ}$  W.;  $26^{\circ}$  N.  $76^{\circ}$  W.;  $41^{\circ}$  N.  $59^{\circ}$  W.; Azores;  $55^{\circ}$ — $56^{\circ}$  N.  $39^{\circ}$ — $31^{\circ}$  W.;  $58^{\circ}$  N.  $48^{\circ}$  W.; S. of Iceland to  $60^{\circ}$  N.  $10^{\circ}$  W.
- November*:  $8^{\circ}$  N.  $28^{\circ}$  W. to the Cape Verde Islands;  $34^{\circ}$  N.  $10^{\circ}$  W.; Azores; Cape Finisterre;  $45^{\circ}$  N.  $7^{\circ}$  W.;  $49^{\circ}$  N.  $12^{\circ}$  W.; along the south coast of Iceland to the Färöes;  $19^{\circ}$  N.  $58^{\circ}$  W. to  $26^{\circ}$  N.  $48^{\circ}$  W.;  $40^{\circ}$  N.  $67^{\circ}$  W. to  $42^{\circ}$  N.  $64^{\circ}$  W.;  $56^{\circ}$  N.  $36^{\circ}$  W.
- December*: Azores;  $50^{\circ}$  N.  $9^{\circ}$  W.; S. Iceland to the Färöe Channel; Caribbean Sea;  $19^{\circ}$  N.  $58^{\circ}$  W. to  $34^{\circ}$  N.  $28^{\circ}$  W.;  $43^{\circ}$  N.  $61^{\circ}$  W.
- 1899 *January*: Canaries; Madeira;  $41^{\circ}$  N.  $69^{\circ}$  W.;  $45^{\circ}$  N.  $49^{\circ}$  W.; Färöes.
- February*:  $34^{\circ}$  N.  $40^{\circ}$  W.
- March*:  $44^{\circ}$ — $46^{\circ}$  N.  $16^{\circ}$ — $11^{\circ}$  W.,  $62^{\circ}$  N.  $7^{\circ}$  W. to  $66^{\circ}$  N.  $20^{\circ}$  W.
- April*:  $28^{\circ}$ — $36^{\circ}$  N.  $75^{\circ}$ — $74^{\circ}$  W.
- June*:  $4^{\circ}$  S.  $19^{\circ}$  W.;  $9^{\circ}$  N.  $25^{\circ}$  W.;  $12^{\circ}$  N.  $52^{\circ}$  W. to  $21^{\circ}$  N.  $45^{\circ}$  W.;  $62^{\circ}$ — $65^{\circ}$  N.  $1^{\circ}$  E— $1^{\circ}$  W., rare in deep sea hauls from 550—200 metres;  $67^{\circ}$  N.  $11^{\circ}$  E.
- July*:  $23^{\circ}$  N.  $36^{\circ}$  W., very rare;  $57^{\circ}$  N.  $23^{\circ}$  W. to  $56^{\circ}$  N.  $38^{\circ}$  W.;  $71^{\circ}$ — $72^{\circ}$  N.  $21^{\circ}$ — $22^{\circ}$  W., very rare in deep sea hauls from 225 and 550 metres;  $71^{\circ}$  N.  $3^{\circ}$  E. rare.



*August*: 56° N. 23° W. to 56° N. 38° W., rare to common; 72°—74° N. 26°—31° E., rare.

*September*: 56° N. 24° W. to 53° N. 48° W., rare; 68° N. 6° W., not rare; 66° N. 3° W. rare between 300 and 167 metres; 61° N. 1° E., rare in a haul from 100 metres; 72°—73° N. 19° E., rare.

*October*: 52° N. 14° W. to 56° N. 38° W., midway common.

*November*: 51° N. 21°—28° W.; 47° N. 51° W., rare.

**Temperature**: 19.0, mean of 192 obs., max. 27.6, min. 0.5.

**Salinity**: 35.50, mean of 153 obs., max. 37.63, min. 31.96.

**Plankton-type.** Noted from the tropical Pacific (108° W. Equ. GIESBR.), the Mediterranean, the North Sea and the Skagerak. This species has of all copepods the widest distribution in the Atlantic, or from 31° S. to 74° N., entering in Desmo-, Styli- and Trichoplankton, but from the general distribution and the mean temperature it is apparent that it belongs essentially to the Styli-plankton. — It is worthy of note that this copepod was by far more abundant in 1898 than in 1899. In March 1898 it scarcely reached north of 50° but it appeared in April at Iceland, in August at Spitzbergen. In the last month it crossed the Denmark Sound for E. Greenland and was in September seen N. of Iceland. — *S. (D. T.)*

#### MIRACIA EFFERATA DANA.

1897 *December* and

1898 *January*: 7° N. 22° W.; 12° N. 50° W.; 18° N. 46° W.; 32° N. 33° W.

*March*: area between 1° S. 15° W., 10° N. 20° W., 14° N. 24° W. and 6° N. 22° W.; 14°—17° N. 50°—47° W.; Caribbean Sea.

*April*: 12° N. 51° W.; 27° N. 75° W.

*May*: 11°—13° N. 52°—51° W.

*July*: 41° N. 60° W.

*September*: 8° N. 25° W.; 27° N. 36° W.

*October*: 32° N. 74° W.

*November*: 19° N. 58° W.; 42° N. 64° W.

1899 *June*: 12° N. 52° W.

**Temperature**: 24.6, mean of 23 obs., max. 28, min. 16.2.

**Salinity**: 35.37, mean of 14 obs., max. 36.50, min. 35.

**Plankton-type.** Noted from the southern Pacific (40° S. 133° W.). It follows in the Atlantic the Equatorial Current from Africa to the north of S. America, enters the Caribbean Sea and the Florida Current. Like many other species of the desmo-type it advances in July beyond 40° N. in the western Atlantic. — *D.*

#### MONOPS BREVIS GIESBR.

1898 *November*: Rio Janeiro, very rare, (♀ ♂).

**Temperature:** 22.

**Salinity:** 33.<sub>81</sub>.

**Plankton-type.** Noted from W. Australia only. — *Nt.*

#### MONOPS PERSPICAX (DANA.)

1898 *March*: 10° N. 20° W.

*August*: 25° N. 74° W.

*September*: 12° N. 51° W.

**Temperature:** 27.<sub>1</sub>, mean of 3 obs., max. 28, min. 26.

**Salinity:** 36.<sub>21</sub> and 36.<sub>33</sub>.

**Plankton-type.** Noted from the eastern equatorial Atlantic. From the above statements it is apparent that this species follows the Equatorial Current from Africa to S. America and enters the Antilles Current. — *D.*

#### OITHONA BREVICORNIS GIESBR.

1898 *February*: 6° S. 12° E., mouth of Congo River.

**Temperature:** 26.<sub>2</sub>.

**Salinity:** 20.<sub>29</sub>.

**Plankton-type.** Noted from Hongkong only. — *Nt.*

#### OITHONA PLUMIFERA BAIRD.

1898 *January*: 7° N. 53° W.; 25°—35° N. 74°—75° W.; 21° N. 17° W.

*February*: 13° N. 70° W. to 30° N. 74° W.; 5° S. 4° E.

*March:* 5° S. 4° W. to 31° N. 24° W.; 11°—21° N. 20°—18° W.; 12° N. 51° W. to 43° N. 17° W.; Caribbean Sea; 28° N. 74° W.; 40° N. 56° W.; 62° N. 2° E.

*April:* 10° N. 53° W.; 22° N. 72° W.; 31° N. 75° W.

*May:* area between 32° N. 37° W., 6° N. 56° W. and 23° N. 56° W.

*June:* 19° N. 63° W. to 25° N. 57° W.; 29° N. 34° W.; 33° N. 48° W.; 71° N. 21° E.

*July:* Caribbean Sea; 21° N. 58° W.; 33° N. 74° W.; 58° N. 0° W.; 61° N. 1° W.

*August:* 14° N. 70° W. to 33° N. 74° W.; Azores; 41° N. 57° W.

*September:* round Cape Verde Islands, common; rare at the following points: 17° N. 48° W.; 31° N. 33° W.; Azores; 53° N. 30° W. and 41° N. 65° W.

*October:* 21° S. 36° W.; Caribbean Sea; Azores; 39° N. 21° W.; 56° N. 31° W.

*November:* 22° N. 53° W.; 29° N. 43° W.; 32° N. 38° W.; Azores; area between 29° N. 19° W., 36° N. 14° W. and 34° N. 10° W.; 42° N. 63° W.; area 53° N. 50° W., 52° N. 38° W. and 56° N. 36° W.; 55° N. 14° W.

*December:* Caribbean Sea; 25° N. 52° W.; 28° N. 47° W.; Azores; Canaries; Gibraltar.

1899 *January:* 29° N. 16° W. to 35° N. 9° W.

*March:* 21° N. 43° W.; 30° N. 35° W.; 46° N. 11° W.; 62° N. 8° W.; 66° N. 20° W.

*April:* 32° N. 75° W.; 36° N. 74° W.

*May:* 33° S. 16° E. to 25° S. 7° E.; 50° N. 33° W.; 35° N. 75° W.; 61° N. 1° E., haul from 100 metres, rare.

*June:* 8° S. 13° W. to 6° S. 16° W.; 9° N. 25° W.; 12°—15° N. 52°—50° W.; 61° N. 1° E. to 67° N. 3° W., deep sea hauls, very rare

*July:* 56° N. 38° W.; 71° N. 21° W., very rare.

*September:* 56° N. 23°—30° W. to 53° N. 31°—37° W., rare.

*November:* 51° N. 31° W., rare.

**Temperature:** 21.8, mean of 123 obs., max. 28.2, min. 0.5.

**Salinity:** 36.04, mean of 88 obs., max. 37.28, min. 33.46.

**Plankton-type.** Noted from the Mediterranean, Indian and Pacific. It has in the Atlantic a very wide range of distribution, both in Desmo- and Styli-plankton, from 33° S. to 66° N., but it occurs only very sparingly north of 40° N. — *S. D.*

### OITHONA SIMILIS CLAUS.

1898 *January*: 16° N. 18° W.; 43° N. 18° W.; 37° N. 73° W.

*February*: 34° N. 40° W.; 50° N. 10° W. to 50° N. 30° W., thence to 45° N. 50° W.; 34° N. 74° W.

*March*: area between the Azores, the English Channel, the Shetlands and 49° N. 33° W.; 43° N. 49° W. to 41° N. 70° W.; 63° N. 2° E. to 58° N. 6° E.; 71° N. 1° E.

*April*: area between the Azores, the English Channel and 39° N. 74° W.; Färöe Channel; 63° N. 17° W.; 73° N. 5° W.

*May*: area between the Azores, Cape Finisterre, the English Channel and 41° N. 58° W.; Färöes; Shetlands; 62° N. 2° E. to 58° N. 6° E.; 66° N. 9° E.; 68° N., 17° W. to 71° N. 15° W.; 77° N. 2° W.

*June*: 31° N. 17° W.; area between the Azores, Cape Finisterre, the English Channel, S.W. of Ireland and 45° N. 26° W.; 58° N. 2° W. to 62° N. 2° E.; 67° N. 10° E.; Beeren Island; 67°—68° N. 24°—23° W.

*July*: Azores; 50° N. 11° W. to 49° N. 22° W.; 42° N. 51° W. to 40° N. 69° W.; area between Westmannaö, 59° N. 2° E. and 67° N. 7° W., thence to 67° N. 22° W.; 78° N. 0° W.—7° E.

*August*: Azores; area between 49° N. 14° W., 56° N. 13° W., 56° N. 28° W. and 48° N. 24° W.; 44° N. 48° W. to 41° N. 65° W.; area between Westmannö, the Hebrides, 60° N. 3° E. and N. Iceland; 72° N. 26° E.; Beeren Island; round Spitzbergen.

*September*: Azores; 43° N. 16° W. to the English Channel and Ireland; area between 48° N. 30° W. and 56° N. 20°—35° W.; 43° N. 48° W.; Färöes; Shetlands; Westmannaö, common; N. of Iceland; 71° N. 20° E.; Beeren Island to Spitzbergen.

*October*: Azores; area between 48° N. 24° W., the Hebrides and 54° N. 45° W.; 42° N. 50° W.; Färöes, not rare.

*November*: many spots on the area between  $51^{\circ}$  N.  $20^{\circ}$  W.,  $40^{\circ}$  N.  $67^{\circ}$  W.,  $53^{\circ}$  N.  $50^{\circ}$  W. and  $56^{\circ}$  N.  $36^{\circ}$  W.; Shetlands; Färöes.

*December*: Canaries; area between  $43^{\circ}$  N.  $18^{\circ}$  W.,  $50^{\circ}$  N.  $9^{\circ}$  W. and  $49^{\circ}$  N.  $30^{\circ}$  W.; area between  $46^{\circ}$ — $42^{\circ}$  N.  $49^{\circ}$  W. and  $42^{\circ}$  N.  $63^{\circ}$  W.; Färöes, common.

1899 *January*: area between the Canaries, Madeira and Gibraltar;  $45^{\circ}$  N.  $49^{\circ}$  W.;  $40^{\circ}$ — $41^{\circ}$  N.  $66^{\circ}$ — $69^{\circ}$  W.; Färöes, not rare.

*February*:  $34^{\circ}$  N.  $40^{\circ}$  W.; Färöes, rare.

*March*:  $33^{\circ}$  N.  $32^{\circ}$  W. to  $48^{\circ}$  N.  $6^{\circ}$  W.;  $66^{\circ}$  N.  $14^{\circ}$ — $20^{\circ}$  W.

*April*: Färöes, very rare; Vestmannaö, rare.

*May*:  $33^{\circ}$  S.  $16^{\circ}$  E. to  $25^{\circ}$  S.  $7^{\circ}$  E.;  $38^{\circ}$  N.  $14^{\circ}$  W.; across the Atlantic from S.W. Ireland to Newfoundland; area between the Färöes,  $56^{\circ}$  N.  $1^{\circ}$  W. and the Skagerak.

*June*:  $21^{\circ}$  S.  $3^{\circ}$  E.;  $5^{\circ}$  S.  $17^{\circ}$  W.;  $62^{\circ}$  N.  $2^{\circ}$  E. to  $69^{\circ}$  N.  $13^{\circ}$  W.; Jan Mayen, rare.

*July*: area between  $56^{\circ}$  N.  $15^{\circ}$  W.,  $56^{\circ}$  N.  $38^{\circ}$  W. and  $43^{\circ}$  N.  $35^{\circ}$  W., as a rule rare;  $71^{\circ}$  N.  $21^{\circ}$  W., rare;  $72^{\circ}$  N.  $21^{\circ}$ — $22^{\circ}$  W., hauls from 180 and 260 metres, rare.

*August*:  $55^{\circ}$  N.  $9^{\circ}$  W. to  $54^{\circ}$  N.  $46^{\circ}$  W., most common midway;  $52^{\circ}$  N.  $53^{\circ}$  W., very common;  $71^{\circ}$  N.  $23^{\circ}$  W. very common;  $73^{\circ}$  N.  $22^{\circ}$  W., rare.

*September*:  $56^{\circ}$  N.  $12^{\circ}$  W. to  $53^{\circ}$  N.  $51^{\circ}$  W., common midway and N.E. of Newfoundland;  $68^{\circ}$  N.  $8^{\circ}$ — $3^{\circ}$  W., rare;  $66^{\circ}$ — $60^{\circ}$  N.  $2^{\circ}$  W.— $3^{\circ}$  E., very common;  $67^{\circ}$ — $63^{\circ}$  N.  $3^{\circ}$  W.— $2^{\circ}$  E., deep-sea hauls from 500—100 metres, rare;  $71^{\circ}$ — $72^{\circ}$  N.  $15^{\circ}$ — $16^{\circ}$  W., very rare.

*October*: area between  $56^{\circ}$  N.  $23^{\circ}$  W.,  $53^{\circ}$  N.  $25^{\circ}$  W. and  $53^{\circ}$  N.  $48^{\circ}$  W., common;  $52^{\circ}$  N.  $14^{\circ}$  W., not rare.

*November*:  $51^{\circ}$  N.  $13^{\circ}$  W. to  $51^{\circ}$  N.  $39^{\circ}$  W., not rare; area between  $49^{\circ}$  N.  $40^{\circ}$  W.,  $53^{\circ}$  N.  $43^{\circ}$  W. and  $47^{\circ}$  N.  $51^{\circ}$  W., common.

**Temperature:** 12.<sub>3</sub>, mean of 78 obs., max. 22<sub>4</sub>, min. 0.<sub>6</sub>. Only such samples considered as contained this species abundantly.

**Salinity:** 35.<sub>00</sub>, mean of 78 obs., max. 36.<sub>35</sub>, min. 31.<sub>84</sub>.

**Plankton-type.** Noted from the Mediterranean. NANSEN collected it at  $78^{\circ}$  N.  $136^{\circ}$  E. and I have seen it in a sample from Bering Sea. One of the most common Atlantic copepods. Its area

of distribution is eastern, from the Cape of Good Hope to the Azores, whence it extends towards the English Channel and New York, between  $40^{\circ}$  and  $50^{\circ}$  N. It is abundant in this area in the spring, becomes scarcer there during the summer, but reappears in the autumn (November). From  $50^{\circ}$  it advances far to the north, goes round Spitzbergen, along E. Greenland, at least to  $73^{\circ}$  N., and in Baffin's Bay at least to  $75^{\circ}$ . It is thus one of the most enduring of all the organisms which constitute the Styli-plankton. — S.

### ONCÆA CONIFERA GIESBR.

1898 *March*: Azores, very rare.

1899 *June*:  $62^{\circ}$  N.  $1^{\circ}$  E. to  $67^{\circ}$  N.  $3^{\circ}$  W., deep sea hauls from 400 to 550 metres, in strata 50 metres below the surface, more or less rare.

*September*:  $71^{\circ}$  N.  $21^{\circ}$  W., haul from 225 metres, rare.

**Temperature:** 0.7, mean of 8 obs., max. 2.7, min. — 1.6; at the Azores 15.5.

**Salinity:** 34.98, mean of 7 obs., max. 35.05, min. 34.71, (at the Azores 35.95).

**Plankton-type.** Noted from the tropical Pacific, the Mediterranean and the Karajakfjord on W. Greenland. NANSEN collected it rather plentifully north of the New Siberian Islands,  $78^{\circ}$  N.  $136^{\circ}$  E. (hauls from 50 metres). G. O. SARS mentions it from the S. coast of Norway. I noted it from the Red Sea and Indian Ocean. The occurrence in the Atlantic seems to prove that it belongs to the Tricho-plankton, although it occurs in the Mediterranean. It is very remarkable that it has never been seen in the Northern Atlantic at the surface. It enters the Atlantic probably from the Polar Basin, ultimately from the Pacific. — T?

### ONCÆA MEDITERRANEA (CLAUS).<sup>1</sup>

1898 *November*:  $42^{\circ}$  N.  $64^{\circ}$  W.

*December*:  $40^{\circ}$  N.  $22^{\circ}$  W.

1899 *March*:  $33^{\circ}$  N.  $32^{\circ}$  W.

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<sup>1</sup> This species is probably not rare in the tropical Atlantic, but of all my notes, I will publish the above only, as I am afraid I have in other cases confounded this species with *O. venusta*.

**Temperature:** 16.<sub>2</sub> to 17.<sub>7</sub>.

**Salinity:** 36.<sub>30</sub> to 36.<sub>54</sub>.

**Plankton-type.** Noted from the Pacific (13° N.—3° S. 99°—132° W.) and the Mediterranean. TH. SCOTT mentions it from Franz Josef Land (5 metres, June 1897). — *S.* or *D.*

#### ONCÆA MEDIA GIESBR.

1898 *January:* 7° N. 22° W.

*March:* 6° S. 4° W. to 11° N. 20° W.

*June:* Azores; 10° N. 53° W.

*July:* 41° N. 58° W.

*August:* 41° N. 57°—59° W.

*September:* 12° N. 27° W.; Azores.

*October:* Azores.

*November:* Rio Janeiro; 0° S. 31° W.; 13° N. 27° W.; 33° N. 10° W.; Azores; 47° N. 41° W.; 42° N. 64° W.

*December:* 30° N. 16° W.; Azores.

1899 *January:* 29°—32° N. 16° W.

*February:* 34° N. 40° W.

*March:* 36° N. 29° W.; 41° N. 21° W.

*April:* 9° N. 59° W.; 36° N. 74° W.

*May:* 32°—33° S. 13°—16° E.

*June:* 8° S.—7° N. 13°—25° W.; 11° N. 26° W.; 15° N. 49° W.

**Temperature:** 22.<sub>2</sub>, mean of 43 obs., max. 28, min. 13.<sub>4</sub>.

**Salinity:** 35.<sub>78</sub>, mean of 29 obs., max. 36.<sub>86</sub>, min. 33.<sub>81</sub>.

**Plankton-type.** Noted from the tropical Pacific and the Mediterranean. — *D.*

#### ONCÆA MINUTA GIESBR.

1898 *March:* Azores; 45° N. 13° W.; 48° N. 18° W.; 58° N. 2° W.; 63° N. 2° E.

*May:* 68° N. 17° W.; 71° N. 15° W.

*June:* 44° N. 9° W.

*July:* 65° N. 1°—6° E.; 78° N. 1° E.—3° W. (deep sea hauls Auriv.)

*August:* 41° N. 57° W.; 60° N. 3° W.; 76°—78° N. 12°—11° E. 81° N. 23° E. (deep sea haul Auriv.)

*September*: 72°—73° N. 19° E.; 76° N. 15° E. (deep sea haul Auriv.)

*November*: Azores; 56° N. 23°—30° W.; 42° N. 63° W.

*December*: Azores.

1899 *March*: Azores; 44° N. 16° W.; 65° N. 13° W.

*May*: 61°—64° N. 6°—9° W.

*June*: 62°—67° N. 1° E.—3° W., hauls from 550 metres.

*July*: 72° N. 22° W., haul from 260 metres.

*September*: 66° N. 3° W., hauls from 500 and 200 metres.

*October*: between 52° N. 21° W., 53° N. 25° W. and 56° N. 23° W., not rare.

*November*: 51° N. 21°—34° W., rare; 49° N. 40° W., rare.

**Temperature:** *a*) in the northern Atlantic 5, mean of 35 obs., max. 12, min. — 0.5, *b*) in the temperate Atlantic 16.3, mean of 7 obs., max. 22, min. 11.

**Salinity:** *a*) in the northern Atlantic 35.02, mean of 36 obs., max. 35.41, min. 33.66, *b*) in the temperate Atlantic 35.42, mean of 5 obs., max. 36.69, min. 34.04.

**Plankton-type.** Noted from the Mediterranean. This species occurs only rarely in the temperate Atlantic, in the region of the Azores and there associated with arctic forms. In the northern Atlantic it is much more frequent and has been seen as far as 72° N. on the west and 78° N. on the east. There is thus more probability that it is an arctic than a temperate form. The occurrence near the Azores and in the Mediterranean must then be accounted for by arctic currents to these regions. Still, the salinity is higher than for Tricho-plankton as a rule. On the other hand this species occurs frequently in the northern Atlantic among masses of *Calanus finmarchicus*. — *T?*

### ONCÆA SUBTILIS GIESBR.

1898 *April*: 39° N. 24° W., common.

*June*: 46° N. 11° W., common.

*September*: 45°—47° N. 14°—9°, scare.

1899 *March*: 46° N. 11° W., common.

*May*: 32° S. 13° E., rare.

*August*: 48°—49° N. 13°—14° W.

*October*: 52° N. 14° W., rare.



**Temperature:** 13, max. 20, min. 12.

**Salinity:** 35.<sub>41</sub> to 35.<sub>92</sub>.

**Plankton-type.** Noted from the Mediterranean. Its range of distribution in the Atlantic is eastern, from 32° S. to 52° N. — S.

### ONCÆA VENUSTA PHILIPPI<sup>1</sup>

1898 *May*: 6° N. 56° W.

*July*: 33° N. 74° W.

*August*: Azores: 41° N. 57°—58° W.

*September*: 18° N. 25° W.

*October*: Azores.

*November*: Azores; Rio Janeiro.

*December*: Azores.

1899 *March*: Azores to 21° N. 43° W.

*May*: 33° S. 16° E.

**Temperature:** 15.<sub>7</sub> to 28.

**Salinity:** 35.<sub>29</sub> to 37.<sub>28</sub>.

**Plankton-type.** Noted from the tropical Pacific, the Mediterranean and the Atlantic between 5° N.—20° S. 24°—38 W. — D. (S.?).

### PARACALANUS ACULEATUS GIESBR.

1898 *January*: 6° N. 55° W.; 12° N. 50° W.

*February*: 26° N. 74° W.

*March*: 1° S. 15° W.; 40° N. 56° W.

*May*: 6° N. 56° W.; 41° N. 56° W.

*August*: 41° N. 57°—58° W.

*November*: 17° N. 25° W.; 19° N. 58° W.

*December*: 19° N. 58° W.

1899 *April*: 9° N. 59° W.

*June*: 7° N. 25° W.

**Temperature:** 23.<sub>9</sub>, mean of 14 obs., max. 28, min. 11.

**Salinity:** 35.<sub>37</sub>, mean of 11 obs., max. 36.<sub>33</sub>, min. 34.<sub>33</sub>.

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<sup>1</sup> This species is probably not rare in the tropical Atlantic, but as I fear I have frequently confounded this species with the nearly allied *O. mediterranea* and *O. media*, I do not publish my older determinations.

**Plankton-type.** Noted from the Pacific, Indian Ocean and Red Sea. According to GIESBRECHT it occurs in the Atlantic between  $3^{\circ}$ — $8^{\circ}$  N.  $24^{\circ}$ — $26^{\circ}$  W., thus in the eastern tropical Atlantic. According to the above data it follows the Equatorial and Florida Currents and advances in the western Atlantic, during March—August, beyond  $40^{\circ}$  N. — *D.*

### PARACALANUS PARVUS CLAUS.

1898 *January:*  $12^{\circ}$  N.  $19^{\circ}$  W.;  $21^{\circ}$  N.  $17^{\circ}$  W.;  $6^{\circ}$  N.  $58^{\circ}$  W.

*February:*  $5^{\circ}$ — $6^{\circ}$  S.  $4^{\circ}$ — $12^{\circ}$  E.; Caribbean Sea.

*March:*  $4^{\circ}$  S.  $10^{\circ}$  W. to  $3^{\circ}$ — $6^{\circ}$  N.  $16^{\circ}$ — $22^{\circ}$  W., thence along the African coast to  $27^{\circ}$  N.; Azores to  $46^{\circ}$  N.  $34^{\circ}$  W.;  $7^{\circ}$  N.  $55^{\circ}$  W.; Caribbean Sea;  $42^{\circ}$  N.  $42^{\circ}$  W. to  $40^{\circ}$  N.  $56^{\circ}$  W.

*April:*  $42^{\circ}$  N.  $19^{\circ}$  W. to  $50^{\circ}$  N.  $10^{\circ}$ — $3^{\circ}$  W.;  $6^{\circ}$  N.  $55^{\circ}$  W.; Caribbean Sea;  $45^{\circ}$  N.  $40^{\circ}$  W.

*May:*  $41^{\circ}$  N.  $16^{\circ}$  W. to  $49^{\circ}$  N.  $11^{\circ}$ — $7^{\circ}$  W.;  $49^{\circ}$  N.  $23^{\circ}$  W. to  $41^{\circ}$  N.  $62^{\circ}$  W.;  $6^{\circ}$  N.  $56^{\circ}$  W.

*June:* area between the Azores,  $42^{\circ}$  N.  $9^{\circ}$  W., the English Channel and  $48^{\circ}$  N.  $35^{\circ}$  W.;  $19^{\circ}$  N.  $63^{\circ}$  W.

*July:* Azores;  $39^{\circ}$  N.  $23^{\circ}$  W.;  $48^{\circ}$ — $50^{\circ}$  N.  $11^{\circ}$ — $22^{\circ}$  W.;  $40^{\circ}$  N.  $69^{\circ}$  W.

*August:* area between  $48^{\circ}$  N.  $23^{\circ}$  W., the English Channel and  $56^{\circ}$  N.  $20^{\circ}$ — $28^{\circ}$  W.;  $58^{\circ}$  N.  $5^{\circ}$  W.;  $60^{\circ}$  N.  $3^{\circ}$  E.

*September:* area between  $46^{\circ}$  N.  $11^{\circ}$  W., the English Channel,  $56^{\circ}$  N.  $27^{\circ}$  W. and  $48^{\circ}$  N.  $24^{\circ}$  W.

*October:*  $42^{\circ}$  N.  $15^{\circ}$  W.;  $50^{\circ}$  N.  $20^{\circ}$ — $10^{\circ}$  W.;  $38^{\circ}$  N.  $74^{\circ}$  W.

*November:* Rio Janeiro, abundant;  $34^{\circ}$  N.  $10^{\circ}$  W.; Azores;  $45^{\circ}$  N.  $7^{\circ}$  W.;  $51^{\circ}$  N.  $20^{\circ}$ — $1^{\circ}$  W.;  $56^{\circ}$  N.  $36^{\circ}$  W.;  $47^{\circ}$  N.  $42^{\circ}$  W.;  $42^{\circ}$  N.  $64^{\circ}$  W.

*December:*  $29^{\circ}$  S.  $49^{\circ}$  W.;  $44^{\circ}$  N.  $57^{\circ}$  W.

1899 *January:*  $29^{\circ}$  N.  $16^{\circ}$  W.; Färöes, common.

*March:*  $33^{\circ}$ — $37^{\circ}$  N.  $32^{\circ}$ — $26^{\circ}$  W.;  $48^{\circ}$  N.  $6^{\circ}$  W.

*April:*  $37^{\circ}$  N.  $9^{\circ}$  W.;  $48^{\circ}$  N.  $9^{\circ}$  W. to  $50^{\circ}$  N.  $5^{\circ}$  W.;  $9^{\circ}$  N.  $59^{\circ}$  W.

*May:*  $32^{\circ}$ — $29^{\circ}$  S.  $13^{\circ}$ — $9^{\circ}$  E.;  $57^{\circ}$  N.  $6^{\circ}$  E.;  $38^{\circ}$  N.  $74^{\circ}$  W.

*July:*  $56^{\circ}$  N.  $0^{\circ}$  W. to  $57^{\circ}$  N.  $4^{\circ}$  E.;  $61^{\circ}$  N.  $0^{\circ}$  W.— $2^{\circ}$  E.

*August:*  $55^{\circ}$  N.  $9^{\circ}$ — $26^{\circ}$  W., rare;  $60^{\circ}$  N.  $3^{\circ}$  E.

*September:*  $56^{\circ}$  N.  $24^{\circ}$ — $33^{\circ}$  W., not common.

*October*: 52° N. 14° W. (not rare) to 56° N. 25° W. (common).  
*November*: 51° N. 21° W., rare.

**Temperature**: 15.<sub>9</sub>, mean of 30 obs., max. 28.<sub>2</sub>, min. 8. (Only such samples considered as contained this species in any abundance).

**Salinity**: 34.<sub>88</sub>, mean of 30 obs., max. 36.<sub>52</sub>, min. 31.<sub>01</sub>.

**Plankton-type**. Noted from the Indian, Pacific and Mediterranean. It occurs in the Atlantic both in the eastern and western part. In the east it goes west of the Cape of Good Hope, in the Gulf of Guinea to Cape Verde, the Azores, the English Channel, the Färöe Channel and the North Sea at least to 61° N. In the west it has been seen at Rio Janeiro, along the north coast of S. America and in the Caribbean Sea, besides above the Newfoundland Banks. — S.

#### PLEUROMMA ABDOMINALE (LUBB).

1898 *January*: 16° N. 18° W.

*February*: 48° N. 41° W.; 50° N. 31° W.

*March*: 40° N. 56° W.

1899 *November*: 49° N. 40° W., rare.

**Temperature**: 13.<sub>7</sub>, mean of 4 obs., max. 20, min. 11.

**Salinity**: 35.<sub>17</sub> (one observation).

**Plankton-type**. Noted from the Mediterranean, Indian and Pacific, in the Atlantic from the Canaries. — S.

#### PLEUROMMA GRACILE CLAUS

1898 *February*: 48°—50° N. 41°—31° W.

*March*: 47° N. 27° W. to 40° N. 64° W.; Azores.

*May*: 48° N. 30° W to 41° N. 54° W.

*June*: 48° N. 33° W.

*July*: 48° N. 30° W.

*September*: 33° N. 31° W.; 35° N. 30° W.; 44° N. 16° W.

*November*: 48°—49° N. 29°—28° W.

1899 *January*: 48° N. 39° W.

*November*: 49° N. 40° W.

**Temperature**: 15.<sub>6</sub>, mean of 18 obs., max. 25.<sub>8</sub>, min. 11.

**Salinity**: 35.<sub>69</sub>, mean of 16 obs., max. 36.<sub>49</sub>, min. 34.<sub>16</sub>.

**Plankton-type.** Noted from the Mediterranean, Indian and Pacific. According to the above statements the area of distribution in the Atlantic is from the S. of the Azores to  $40^{\circ}$ — $50^{\circ}$  N.  $16^{\circ}$ — $64^{\circ}$  W., thus across the whole Atlantic. It appears there, midway between Europe and America, in the winter and spreads westwards, so that already in March, it reached nearly to the coast of N. America. It soon became rare in this region, but reappeared in September SW. and NE. of the Azores, in November midway between the Engl. Channel and New York. — S.

#### PONTELLINA PLUMATA DANA.

1898 *February*:  $5^{\circ}$  S.  $4^{\circ}$  E.

*March*:  $2^{\circ}$  N.  $25^{\circ}$  W.;  $7^{\circ}$  N.  $17^{\circ}$  W.;  $11^{\circ}$  N.  $20^{\circ}$  W.

*September*: Azores.

**Temperature**: 25.8, mean of 5 obs., max. 28, min. 21.7.

**Salinity**: 35.22, mean of 4 obs., max. 36.33, min. 34.12.

**Plankton-type.** Noted from the Cape of Good Hope, Cape Verde,  $5^{\circ}$  N.  $24^{\circ}$ — $44^{\circ}$  W., the Mediterranean and the Pacific. — *D?* (*Nt.* ?).

#### PSEUDOCALANUS ELONGATUS (BOECK.)

1898 *February*:  $50^{\circ}$  N.  $10^{\circ}$  W.;  $45^{\circ}$  N.  $50^{\circ}$  W.

*March*: Färöes;  $41^{\circ}$ — $40^{\circ}$  N.  $60^{\circ}$ — $68^{\circ}$  W.

*April*:  $48^{\circ}$  N.  $5^{\circ}$  W.;  $50^{\circ}$  N.  $10^{\circ}$ — $3^{\circ}$  W.; Shetlands; Färöes.

*May*:  $50^{\circ}$  N.  $11^{\circ}$  W.; Färöes; Shetlands;  $62^{\circ}$ — $58^{\circ}$  N.  $4^{\circ}$  E.;  $40^{\circ}$  N.  $68^{\circ}$  W.

*June*: Färöes; Shetlands;  $58^{\circ}$  N.  $2^{\circ}$  W.;  $75^{\circ}$  N.  $20^{\circ}$  E.  $77^{\circ}$  N.  $27^{\circ}$  E. (deep sea haul. Auriv.)

*July*: Färöes; Shetlands;  $78^{\circ}$  N.  $1^{\circ}$  E.— $3^{\circ}$  W.; (deep sea haul. Auriv.)

*August*: Westmannaö; Färöes;  $60^{\circ}$  N.  $3^{\circ}$  E.;  $80^{\circ}$  N.  $10^{\circ}$  E.

*September*: Färöes; Rockall ( $57^{\circ}$  N.  $14^{\circ}$  W.);  $74^{\circ}$  N.  $19^{\circ}$  E.;  $76^{\circ}$  N.  $15^{\circ}$  E. (deep sea haul. Auriv.)

*October*: Färöes;  $59^{\circ}$  N.  $1^{\circ}$  W.;  $40^{\circ}$  N.  $67^{\circ}$  W.

*November*:  $51^{\circ}$  N.  $2^{\circ}$  W.; S. Iceland; Färöes;  $45^{\circ}$  N.  $50^{\circ}$  W.

*December*: Färöes;  $43^{\circ}$  N.  $61^{\circ}$  W. to  $47^{\circ}$  N.  $45^{\circ}$  W.

1899 *January*: Färöes, common;  $41^{\circ}$ — $40^{\circ}$  N.  $69^{\circ}$ — $66^{\circ}$  W.

*February*: Färöes, common.

*March*: 66°—67° N. 20°—23° W., abundant; Färöes.

*April*: 50° N. 6° W.; Färöes, abundant.

*May*: N. and S. of Iceland, Färöes; 60°—61° N. 1° E.; 57° N. 3° E.; 58° N. 3°—9° E.

*June*: 68° N. 11° W.; 67° N. 3° W.; 65° N. 1° W.; 64°—62° N. 0°—2° E.

*July*: 74° N. 18° W.; 62°—61° N. 0° W.—2° E.; 56°—58° N. 0° W.—6° E.

*August*: 56° N. 14° W., not rare; 60° N. 3° E.; 76° N. 41° E.

*September*: 52° N. 55° W., not rare; 69° N. 13° W.; 67° N. 3° W.; 61° N. 1° E.; 74° N. 17° E.

*November*: 47° N. 51° W., not rare.

**Temperature**: 8.<sub>9</sub>, mean of 57 obs., max. 18.<sub>2</sub>, min. 0.

**Salinity**: 34.<sub>53</sub>, mean of 53 obs., max. 35.<sub>60</sub>, min. 31.<sub>77</sub>. (The above figures relate to the Atlantic only; it occurs in the Baltic in water with 6 salinity).

**Plankton-type**. Noted from Baffin's Bay, 76° N. 64° W., Davis's Strait, 70° N. 54° W., W. of Spitzbergen, 79° N. 6° W., the Baltic (to Åland) and the Gulf of Finland. NANSEN collected it at 78° N. 136° E. — *Ng* (*Ns*, *T*)

#### RHINOCALANUS CORNUTUS DANA.

1898 *March*: 42° N. 42° W.

*May*: 43° N. 45° W.; 20° N. 60° W.

*December*: Azores.

*June*: 12° N. 52° W.

**Temperature**: 20.<sub>4</sub>, mean of 5 obs., max. 27.<sub>1</sub>, min. 16.

**Salinity**: 36.<sub>24</sub>, mean of 5 obs., max. 36.<sub>45</sub>, min. 36.<sub>09</sub>.

**Plankton-type**. Noted from the Gulf of Guinea, the Canaries and the Pacific — *D*. (and *S*?).

#### RHINOCALANUS NASUTUS GIESBR.

1898 *January*: 21° N. 17° W.

*March*: 6° N. 22° W.; 21° N. 18° W.; Azores; 46° N. 34° W.; 43° N. 41° W.; 40° N. 56° W.

*April*: 47° N. 31° W.; 31' N. 75° W.

*May*: 48° N. 30° W.; 41° N. 54° W.

**Temperature**: 15.5, mean of 12 obs., max. 22, min. 11.

**Salinity**: 35.61, mean of 9 obs., max. 36.59, min. 34.16.

**Plankton-type**. Noted from the west of Magellan Straits to 6° N., off Gibraltar, in the Mediterranean and off Scotland. — S.

#### SAPPHIRINA GEMMA DANA.

1898 *March*: 7°—11° N. 17°—20° W.

**Temperature**: 24.6 to 27.8.

**Salinity**: 35.20 to 35.25.

**Plankton-type**. This species has been found south of the Cape of Good Hope, in the Mediterranean and the Pacific. The plankton in which I found the above specimens was Desmo-plankton. — D.

#### SAPPHIRINA NIGROMACULATA CLAUS.

1898 *February*: 5°—6° S. 9°—12° W.

*March*: 3° N. 16° W.; 36° N. 29° W.

*June*: 25° N. 57° W.

*August*: 49° N. 23° W.; 44° N. 42° W.; 41° N. 58° W.

*October*: Azores.

**Temperature**: 23.9, mean of 9 obs., max. 28.2, min. 17.3.

**Salinity**: 33.52, mean of 8 obs., max. 36.59, min. 20.29.

**Plankton-type**. Noted from the Mediterranean and the Pacific. According to the above data it has the distribution of the Desmo-plankton, but seems to keep more to the coasts than to the open sea. It follows the other Desmo-species in August to the area between 40°—50° N. — D.

#### SAPPHIRINA OPALINA DANA.

1898 *August*: 14° N. 70° W., very rare.

**Temperature**: 27.5.

**Salinity**: 34.72.

**Plankton-type.** Noted from the Pacific, Gulf of Panama and the Mediterranean. — *D.*

**SAPPHIRINA OVATOLANCEOLATA** DANA.

1899 *April*: 15° S. 5° W., very rare.

**Temperature:** 23.

**Salinity:** 36.<sub>61</sub>.

**Plankton-type.** Noted from Rio Janeiro, 18°—20° S. 25°—38° W. and the Mediterranean. — *D.*

**SAPPHIRINA SINUCAUDA** BRADY.

1898 *March, September and October*: Azores.

**Temperature:** 17.<sub>3</sub> to 21.<sub>9</sub>.

**Salinity:** 36.<sub>28</sub> to 36.<sub>59</sub>.

**Plankton-type.** Noted from the Pacific. — *S?*

**SAPPHIRINA STELLATA** GIESBR.

1898 *March*: 16° N. 47° W.

*April*: 31° N. 75° W.

*May*: 20° N. 60° W.

**Temperature:** 24.<sub>4</sub> to 27.<sub>1</sub>

**Salinity:** 36.<sub>04</sub> to 36.<sub>45</sub>.

**Plankton-type.** Noted from the west of Australia and the Pacific. My specimens occurred in the Antilles and Florida Currents. — *D.*

**SCOLECITHRIX DANÆ** (LUBBOCK.)

1898 *February*: 5° S. 9° E.

*March*: 3° N. 16° W.; 7° N. 17° W.

*November*: 17° N. 25° W.

*December*: 34° N. 38° W.

**Temperature:** 25.<sub>6</sub>, mean of 5 obs., max. 28.<sub>2</sub>, min. 19.<sub>2</sub>.

**Salinity:** 35.<sub>28</sub>, mean of 5 obs., max. 36.<sub>59</sub>, min. 33.<sub>93</sub>.

**Plankton-type.** Noted from the Pacific, the Mediterranean and Atlantic,  $18^{\circ}$  S.— $18^{\circ}$  N.  $38^{\circ}$ — $24^{\circ}$  W. According to the above data it occurs west of Africa between  $5^{\circ}$  S and  $17^{\circ}$  N. and SW. of the Azores. — *D.*

### SETELLA GRACILIS DANA.

1897 *December* and

1898 *January*:  $12^{\circ}$  S.  $34^{\circ}$  W.;  $26^{\circ}$  N.  $39^{\circ}$  W. to  $12^{\circ}$  N.  $50^{\circ}$  W.:

Caribbean Sea;  $25^{\circ}$ — $29^{\circ}$  N.  $74^{\circ}$  W.;  $15^{\circ}$  N.  $16^{\circ}$  W.

*February*:  $5^{\circ}$  S.  $8^{\circ}$ — $4^{\circ}$  E.; Caribbean Sea;  $26^{\circ}$ — $30^{\circ}$  N.  $74^{\circ}$  W.

*March*: area between  $1^{\circ}$  S.  $27^{\circ}$ — $15^{\circ}$  W. and  $10^{\circ}$  N.  $20^{\circ}$  W.;

Azores;  $28^{\circ}$  N.  $38^{\circ}$  W. to  $9^{\circ}$  N.  $53^{\circ}$ — $59^{\circ}$  W.; Caribbean Sea.

*April*: area between  $7^{\circ}$  N.  $54^{\circ}$  W.,  $10^{\circ}$  N.  $52^{\circ}$  W. and  $12^{\circ}$  N.

$51^{\circ}$  W.; Caribbean Sea;  $31^{\circ}$  N.  $75^{\circ}$  W.

*May*: area between  $6^{\circ}$  N.  $56^{\circ}$  W.;  $17^{\circ}$  N.  $50^{\circ}$  W.,  $26^{\circ}$  N.  $52^{\circ}$

W. and  $20^{\circ}$  N.  $60^{\circ}$  W.;  $41^{\circ}$  N.  $51^{\circ}$  W.

*June*: area between  $10^{\circ}$  N.  $53^{\circ}$  W.,  $23^{\circ}$  N.  $42^{\circ}$  W.,  $30^{\circ}$  N.

$52^{\circ}$  W. and  $24^{\circ}$  N.  $58^{\circ}$  W.

*July*:  $24^{\circ}$ — $26^{\circ}$  N.  $54^{\circ}$ — $48^{\circ}$  W.; Caribbean Sea;  $33^{\circ}$ — $38^{\circ}$  N.

$74^{\circ}$  W.;  $40^{\circ}$  N.  $67^{\circ}$  W. to  $41^{\circ}$  N.  $58^{\circ}$  W.

*August*: Caribbean Sea;  $42^{\circ}$  N.  $62^{\circ}$  W. to  $42^{\circ}$  N.  $48^{\circ}$  W.

*September*:  $15^{\circ}$ — $17^{\circ}$  N.  $49^{\circ}$ — $48^{\circ}$  W.; Caribbean Sea;  $41^{\circ}$  N.

$65^{\circ}$  W. to  $46^{\circ}$  N.  $39^{\circ}$  W.; Canaries; Cape Verde Islands.

*October*: Caribbean Sea; Bahamas;  $34^{\circ}$  N.  $74^{\circ}$  W.;  $41^{\circ}$  N.

$59^{\circ}$  W.

*November*: area between  $18^{\circ}$  S.  $31^{\circ}$  W.,  $9^{\circ}$  S.  $34^{\circ}$  W. and

$8^{\circ}$  N.  $28^{\circ}$  W.; Cape Verde Islands;  $22^{\circ}$  N.  $53^{\circ}$  W. to  $29^{\circ}$

N.  $43^{\circ}$  W.;  $42^{\circ}$  N.  $63^{\circ}$  W.;  $47^{\circ}$  N.  $41^{\circ}$  W.;  $36^{\circ}$  N.  $14^{\circ}$  W.

*December*:  $29^{\circ}$  S.  $49^{\circ}$  W.;  $19^{\circ}$  N.  $58^{\circ}$  W. to  $28^{\circ}$  N.  $47^{\circ}$  W.

1899 *March*:  $21^{\circ}$ — $24^{\circ}$  N.  $40^{\circ}$ — $43^{\circ}$  W.

*April*:  $32^{\circ}$  N.  $75^{\circ}$  W.

*June*:  $12^{\circ}$ — $15^{\circ}$  N.  $52^{\circ}$ — $50^{\circ}$  W.

**Temperature:** 24.5, mean of 92 obs., max. 28.1, min. 16.

**Salinity:** 35.69, mean of 66 obs., max. 38.54, min. 28.10.

**Plankton-type.** Noted from the Mediterranean and the Pacific.

This species occurs in the warmest part of the Atlantic, between Africa and S. America. It occurred in the Sargasso Sea in January



to June to about  $30^{\circ}$  N., then it decreased considerably, but reappeared in November. It occurred in the Florida Current, during January and April, to about  $30^{\circ}$ , in July north of  $40^{\circ}$  N. to  $58^{\circ}$  W., in August to  $48^{\circ}$  W., in September to  $39^{\circ}$  W. In the last named month it appeared at the Canaries and the Cape Verde Islands. — *D.*

### TEMORA LONGICORNIS (O. F. MÜLL.)

1898 *March*:  $42^{\circ}$ — $43^{\circ}$  N.  $42^{\circ}$ — $41^{\circ}$  W.;  $40^{\circ}$ — $41^{\circ}$  N.  $68^{\circ}$ — $70^{\circ}$  W.

*April*:  $48^{\circ}$ — $50^{\circ}$  N.  $5^{\circ}$ — $3^{\circ}$  W.

*May*:  $49^{\circ}$  N.  $23^{\circ}$  W.; S. Iceland; area between  $58^{\circ}$ — $59^{\circ}$  N.  $6^{\circ}$ — $5^{\circ}$  E.;  $62^{\circ}$  N.  $5^{\circ}$ — $2^{\circ}$  E. and  $64^{\circ}$  N.  $6^{\circ}$  E.;  $43^{\circ}$  N.  $43^{\circ}$  W.

*June*:  $40^{\circ}$ — $44^{\circ}$  N.  $10^{\circ}$ — $9^{\circ}$  W.; S. Iceland; Färöes.

*July*: S. Iceland; Färöes; Shetlands;  $59^{\circ}$  N.  $2^{\circ}$  E.;  $40^{\circ}$  N.  $69^{\circ}$  W.

*August*: S. Iceland; Färöes;  $58^{\circ}$  N.  $2^{\circ}$  W.— $0^{\circ}$  E.;  $41^{\circ}$  N.  $72^{\circ}$  W.

*September*: N., S. and E. of Iceland; Färöes; Shetlands; English Channel.

*October*: Färöes, abundant;  $41^{\circ}$  N.  $59^{\circ}$  W.

*November*; Färöes.

*December*:  $42^{\circ}$  N.  $49^{\circ}$  W.

1899 *May*: area between  $63^{\circ}$  N.  $7^{\circ}$  W.,  $60^{\circ}$  N.  $1^{\circ}$  E. and  $57^{\circ}$  N.  $6^{\circ}$  E.

*June*: Westmannaö;  $63^{\circ}$  N.  $1^{\circ}$  E.

*July*: area between  $57^{\circ}$ — $60^{\circ}$  N.  $1^{\circ}$  E. and  $58^{\circ}$  N.  $6^{\circ}$  E.

*September*:  $72^{\circ}$  N.  $19^{\circ}$  E.;  $60^{\circ}$ — $61^{\circ}$  N.  $3^{\circ}$ — $1^{\circ}$  E.

**Temperature**: 10.<sub>8</sub>, mean of 46 obs., max. 21, min. 5.5

**Salinity**: 34.<sub>16</sub>, mean of 42° obs., max. 36.<sub>21</sub>, min. 31.<sub>01</sub>.

**Plankton-type.** This species occurs from Iceland to the Färöes, the Shetlands, the British Islands, the English Channel, the North Sea and the Skagerak, the Baltic to Åland and the whole coast of Norway to  $70^{\circ}$  N.  $20^{\circ}$  E.; in the west above the Newfoundland Banks along the east coast of N. America. In the winter it may occur S. of  $50^{\circ}$  N. and in the spring along the Spanish Peninsula. — *Ns.* (*T.*).

**TEMORA STYLIFERA** (DANA).

1898 *January*: Azores; 16° N. 18° W.

*February*: 5° S. 4°—9° E.; Caribbean Sea.

*March*: 4° S. 10° W. to the Cape Verde Islands and 21° N. 18° W., thence to the Azores; 17° N. 47° W.; 7°—9° N. 55°—59° W.; 40° N. 56° W.; 42° N. 42° W.

*April*: 10° N. 52° W.

*May*: 6° N. 56° W.; 17° N. 50° W.; 41° N. 63°—56° W.

*June*: 10° N. 53° W.

*July*: 33°—38° N. 74° W.; 41° N. 58° W.

*August*: Caribbean Sea; 21° N. 74° W.; 38° N. 74° W.; 41° N. 58° W. to 42° N. 48° W.

*September*: 17° N. 48° W.; 42° N. 57° W.

*November*: Rio Janeiro; Cape Verde Islands; 34° N. 10° W.; 42° N. 64° W.

*December*: 34° N. 38° W.

**Temperature**: 22.<sub>6</sub>, mean of 40 obs., max. 28.<sub>1</sub>, min. 11.

**Salinity**: 34.<sub>98</sub>, mean of 34 obs., max. 36.<sub>76</sub>, min. 28.<sub>10</sub>.

**Plankton-type**. Noted from the Mediterranean. It occurs, according to the above statements, along the coasts of the tropical and subtropical Atlantic, for which reason I have considered this species as belonging to the Styli-plankton of the tropical Atlantic, but the low mean salinity and its absence from the area between the Canaries and the Newfoundland Banks make it more probable that is a tropical, neritic form. — *Nt*.

**TEMORA TURBINATA** (DANA).

1898 *January*: 12°—16° N. 19°—18° W.

*February*: 6° S. 12° E.

*March*: 18° N. 18° W.

**Temperature**: 20—22.

**Salinity**: 20.<sub>29</sub>, (one obs. only).

**Plankton-type**. This species is noted from the Sulu Sea, Hongkong and Amoy. — *Nt*.

**THALESTRIS KROHNII** (KRÖYER). G. O. Sars.

(Determination by G. O. Sars.)

1898 *March*: 63° N. 2° E., very rare. .**Temperature:** 6.7.**Salinity:** 35.10.**Plankton-type.** Noted from the west coast of Norway, especially off Finmark (G. O. Sars). My specimens occurred in a very scanty plankton, containing typical Tricho- and Styli-species. — *T*?

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## Chætognata.<sup>1</sup>

### KROHNIA HAMATA (MOEB.)

(STRODTMANN: D. Systematik d. Chætognaten, Berl. 1892, pag. 20).

1898 *July*: 72° N. 1° E. and 78° N. 1° E.—3° W.; (deep sea hauls. Auriv.)

*August*: 54° N. 47° W.; 77°—80° N. 12°—10° E., (deep sea hauls. Auriv.).

*September*: 56° N. 27°—36° W.

1899 *June*: 67° N. 3° W., rare; 62°—67° N. 0° 37' E.—2° 52' W. from strata below 100 metres.

*July*: 71°—74° N. 21°—18° W., hauls from 280 metres; 53° N. 42° W., rare.

*September*: 62°—67° N. 0° 37' E.—2° 55' W., (below 50 metres and a haul from 500 to 25 metres).

**Temperature:** 10° to 11°.

**Salinity:** 34° to 35°.

**Plankton-type.** Noted from 51° S. 9° E. (depth 70 m.), the S. Equatorial and Guinea Currents, the Sargasso Sea and Florida Currents (deep water), Irminger sea and Baffin's Bay (Chun: D. Beziehungen zwischen dem arctischen und antarct. Plankton. Stuttg. 1897). — *T.*

### SAGITTA ARCTICA AURIV.

(Plankton d. Baffins Bay u. Davis's Strait. Upsala 1896, pag. 188).

1898 *July*: Spitzbergen; 78° N. 1° E.—3° W. (deep sea haul. Auriv.)

*August*: 81° N. 23° E. (deep sea haul. Auriv.)

*September*: 76° N. 15° E. (deep sea haul. Auriv.)

*November*: 60° N. 1° W.

1899 *March*: 62° N. 7° W.

*June*: 65°—67° N. 1°—3° W., haul from 500 to 200 metres.

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<sup>1</sup> See Steinhaus, D. Verbr. d. Chætognoten Kiel 1896 8°, a paper, with which I became acquainted first when the above was in the press.

*July*: 71°—74° N. 21°—18° W., deep sea haul.

*September*: 67° N. 3° W., haul from 500 metres.

**Temperature**: 5.6 to 10 (4.8 to 6.7 Auriv.)

**Salinity**: 35.22 to 35.34 (33.13 to 34.96 Auriv.)

**Plankton-type**. Noted from Baffin's Bay, Davis's Strait and the Skagerak (surface in February, in deeper water at other periods).  
— *T*.

### SAGITTA BIPUNCTATA QUOI & GAIM.

(STRODTMANN: D. Systematik d. Chætognaten, Berlin 1892, pag. 14).

1898 *January*: 12°—21° N. 19°—17° W.; 36° N. 27° W. to 46° N. 11° W.; 6° N. 55° W.

*February*: 5°—6° S. 9°—12° E.

*March*: 6° S. 4° W.; 7° N. 17° W. to Cape Verde Islands and 21° N. 18° W.; 36° N. 29° W. to 45° N. 13° W.; 49° N. 33° W.; Färöes.

*April*: Caribbean Sea; 34° N. 74° W.; 41° N. 19° W.

*May*: 32° N. 37° W. to 43° N. 11° W.; 58° N. 4° E.; 11° N. 52° W.; 23° N. 56° W.; 41° N. 63° W.

*June*: 33° N. 48° W.; Azores.

*July*: 59° N. 2° E.; 21° N. 58° W.; 38° N. 74° W.

*August*: Azores; S. Iceland; Färöes; 61° N. 4° E.

*September*: 8° N. 25° W.; Azores; 56° N. 21° W., abundant; Färöes.

*October*: Azores to 42° N. 15° W.; 57° N. 18° W.; Färöes; 34° N. 74° W.

*November*: area between Rio Janeiro, 26° S. 30° W. and 18° S. 31° W.; 34° N. 10° W.; Azores; 56° N. 17° W.; Färöes.

*December*: Azores; Färöes, common.

1899 *January*: Färöes.

*March*: Azores; 44° N. 16° W.

*June*: 17°—19° S. 2°—0° W.

*August*: 55°—56° N. 23°—26° W.

*September*: 56° N. 24°—30° W.

*October*: 53° N. 37° W.

*November*: 51° N. 21° W.; 49° N. 40° W.

**Temperature**: 19.4, mean of 66 obs., max. 27.5, min 10.2

**Salinity**: 35.02, mean of 44 obs., max. 37.3, min. 32.70.

**Plankton-type.** This species appeared in June 1899 near St. Helena and was seen in November 1898 off Rio Janeiro. In the northern hemisphere it follows the coasts of both Africa and America, but occurs chiefly between the Azores and the Bay of Biscay. Its northern limit seems to be S. Iceland, the Färöes and western Norway. It occurs abundantly in the North Sea and the Skagerak. — *S. (Nm.)*.

### SAGITTA ENFLATA (GRASSI.)

(STRODTMANN: D. Systematik d. Chætognaten, Berlin 1892, pag 18).

1898 *March*: 3° 30' N. 16° W. to 11° N. 20° W., abundant.

**Temperature:** 24.<sub>6</sub> to 28.<sub>2</sub>.

**Salinity:** 34.<sub>86</sub> to 35.<sub>25</sub>.

**Plankton-type.** Noted from Madeira and the Mediterranean. Evidently a neritic form. — *Nt.*

### SAGITTA SERRATO-DENTATA (KROHN).

(STRODTMANN: D. Systematik d. Chætognaten, Berlin 1892, pag. 17 fig. 2).

1898 *January*: 15° N. 18° W.

*March*: 6° S. 4° W. to 23° N. 28° W.

*September*: 12° N. 27° W.

*November*: 19° N. 58° W.

**Temperature:** 24.<sub>2</sub>, mean of 8 obs., max. 27.<sub>5</sub>, min. 20.

**Salinity:** 35.<sub>99</sub>, mean of 7 obs., max. 36.<sub>91</sub>, min. 34.<sub>86</sub>.

**Plankton-type.** Noted from the Mediterranean. — *D.*

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## Ctenophora.

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### BEROË CUCUMIS FABR.

(M. Sars: Beskr. og Iakttagelser. Bergen 1835, pag. 30—32. Pl. VI, fig. 15 a—d.)

1898 *July*: Spitzbergen; 78° N. 1° E. (deep sea haul, Auriv.)

*September*: Westmannaö.

1899 *June*: Jan Mayen; 74° N. 14° W.

*July*: 75° N. 18° W.

**Temperature:** 1.5, mean of 6 obs., max. 8.9, min. —0.9.

**Salinity:** 33.68, mean of 6 obs. max. 34.94, min. 32.65.

**Plankton-type.** This species is noted from Baffins' Bay, 78° N., St. Lawrence Gulf, Bay of Massachusetts, the Shetlands, Scotland, Holland, Heligoland and the Skagerak (AURIVILLIUS). — *T. Ng.*

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## **Siphonophora.**

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### **VELELLA SPIRANS FORSKÅL.**

(Chun. Ergebnisse d. Plankton Exp. Siphonophoren, pag. 93).

1899 *August* (29<sup>th</sup>): 60° 55' N. 0° 20' W.

**Temperature:** 12.6.

**Salinity:** 35.41.

**Plankton-type.** Found by the Plankton-Expedition (Brandt Reisebeschr. Pl. VIII) in September in the Guinea current, W. of Africa, and in the S. Equatorial Current near S. America. Occurs in the Mediterranean and probably in the Pacific. — *D.*

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## **Acraspeda.**

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### **CYANEA ARCTICA** PÉR. & LES.

(Hkl. Syst. d. Medusen pag. 530.)

1899 *July*: 74° N. 18° W. (fide J. ARWIDSSON).

**Plankton-type.** Noted from Spitzbergen, Greenland and the Atlantic coast of North America to New York. — *T. (Ns)*.

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## Craspedota.

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### AGLANTHA DIGITALE (O. F. MÜLL.)<sup>1</sup>

(Hkl. Syst. d. Medusen pag. 272, Pl. XVI, fig. 5, 6.)

1898 *May*: 57° N. 25° W. to 60° N. 7° W., rare to common.

*June*: 60° N. 8°—9° W.; 60° N. 14° W.

*July*: 78° N. 3° W. (deep sea haul).

*August*: 65° N. 33° W., not rare; 62° N. 18° W., rare.

1899 *June*: 64° N. 0° E. (deep sea haul); 67° N. 3° W. (deep sea haul).

*July*: 74° N. 18° W. (deep sea haul).

*September*: 61° N. 1° E., not rare; 63° N. 1° E. rare; 67° N. 3° W. (deep sea haul).

**Temperature:** 9.7, mean of 7 obs.

**Salinity:** 35.48, mean of 7 obs., max. 35.57, min. 35.24.

**Plankton-type.** This species seems to occur in the Northern Pacific (*A. Kamtschatica* BRANDT). It is noted from Baffin's Bay, Davis's Strait, Newfoundland to about 42° N., from the Shetlands and Norway. — *T.*

### CODONIUM PRINCEPS HKL.

(System de Medusen I p. 13 Pl. I fig. 1, 2, 1879.)

1898 *August*: 78°—80° N. 27°—11° E. (AURIVILLIUS).

1899 *June*: 64° N. 0° E. (fide J. ARWIDSSON).

*September*: 74° N. 18° E.

**Temperature:** 1 to 3.5.

**Salinity:** 32.96 to 34.53.

**Plankton-type.** — *T.*

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<sup>1</sup> Ostenfeld's data used.

**PECTYLLIS ARCTICA** HÆCKEL.

(Syst. d. Medusen I pag. 266).

1898 *July*: 78° N. 19° E. (AURIVILLIUS).1899 *July*: 75°—72° N. 17°—22° W. (hauls from 180 and 350 metres).*August*: 71°—74° N. 22°—25° W. (hauls from 70 and 125 metres).**Plankton-type.** Noted from Greenland (72° N. 51°—55° W. Auriv.) and Halifax (haul from 2,500 m.)**Remark.** The above data for 1899 have been communicated by J. ARWIDSSON.**STEENSTRUPIA GALANTHUS** HKL.

(Syst. d. Medusen pag. 31.)

1898 *June*: Färöes.*July* and *August*: Westmannaö.**Temperature**: 7.6 to 10.2.**Salinity**: 34.05 to 35.05.**Plankton-type.** Noted from the British coasts, east and west, the Shetlands and Heligoland. — *N's*.**TIARA PILEATA** L. AGASS.

(HÆCKEL. Syst. d. Medusen pag. 58 Pl. III fig. 6—8.)

1898 *September*: 61° N. 1° E. (haul from 100 and 25 metres).**Plankton-type.** Noted from the Mediterranean and the Atlantic coasts of France, Gt. Britain and Norway. — *S. (Nm.)*

## Zoantharia.

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### ARACHNACTIS ALBIDA M. Sars.<sup>1</sup>

(Vanhöffen: Biblioth. zool. 1895 XX Pl. I.)

1898 *August*: 60° N 4° W.; 61° N. 0° W., common.

*September*: 60° N. 6° W.; 60° N. 3° W., not rare.

1899 *September*: 62° N. 1° E., rare.

**Temperature:** 12.1, mean of 4 obs., max. 13, min. 10.4.

**Salinity:** 35.87, mean of 4 obs., max. 35.47, min. 35.24.

**Plankton-type.** This species is only known to exist from about 56° N. 20° W. to 61° 50' N. 5° 20' E. The mean temperature and salinity agree with the numbers for Styli-plankton, but as long as the distribution is not better known, the plankton-type may be undecided.

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<sup>1</sup> Ostenfeld's data used.

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## Ciliata.

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### AMPHORELLA AMPHORA (CLAP. & LACHM.) ENTZ.<sup>1</sup>

(v. DADAY Mitth. zool. stat. Neapel. Vol. VII. 1887, pag. 535. Pl. XVIII fig. 4.  
JÖRGENSEN Bergens Mus. Aarbog 1899, pag. 12)

1897 *December*: 34° N. 30° W.; 39° N. 24° W.; 12° N. 50° W.

1898 *February*: 34° N. 73° W.

*March*: 32° N. 74° W.

*April*: 42° N. 47° W.

*June*: 37° N. 25° W. to 50° N. 12° W.

*August*: S. of Iceland; 44° N. 42° W.; 40° N. 66° W.

*September*: 46° N. 11° W.; N. and SW. of Iceland; 41° N. 65° W.

*October*: 57° N. 27° W. to the Färöe Channel.

*November*: 34° N. 10° W.; 56° N. 23° W.; 48° N. 29° W.;  
47°—48° N. 41° W.; Färöe Channel.

*December*: 49° N. 30°—35° W.

1899 *January*: 31° N. 16° W.

*March*: 37° N. 26° W.

*April*: 41° N. 17°—18° W.

*June*: 20° S. 1° E. to 4° S. 19° W.

*July*: 45°—48° N. 31°—25° W.

*November*: 51° N. 28° W.

**Temperature**: 16.3, mean of 36 obs., max. 26.7, min. 7.

**Salinity**: 35.50, mean of 30 obs., max. 36.59, min. 33.78.

**Plankton-type.** Noted from the Mediterranean. Its distribution in the Atlantic is on the whole an eastern one, from the W. of S. Africa to Iceland, but it has nevertheless been seen, although very seldom, in the western area. — S.

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<sup>1</sup> Ostenfeld's data for *Tintinnus quadrilineatus* included.

**AMPHORELLA GANYMEDES ENTZ.**

(*Tintinnus gan.* Entz. Mitth. Zool. Stat. Neapel. Vol. V. 1884, pag. 409, Pl. XXIV fig. 17, 18. *Amph. gan.* v. Dad. l. c. Vol. VII pag. 539. Pl. XVIII fig. 18)

1898 *March*: 41° N. 21° W.; 45° N. 13° W.

*April*: 41° N. 19° W.; 48° N. 29° W.

*May*: 50° N. 14° W. to 42° N. 61° W.

*June*: 50° N. 12° W.; 44° N. 9° W.

*August*: 49° N. 14° W. to 48° N. 24° W.

*September*: Azores to the Engl. Channel; 50° N. 11° W.

*November*: 45°—49° N. 7°—12° W.; 48° N. 41° W. to 43° N. 61° W.

*December*: 50° N. 20° W. to 41° N. 66° W.

1899 *March*: 30° N. 35° W.

*April*: 42° N. 18° W.; 36° N. 74° W.

*May*: 30° N. 35° W.

*June*: 20° S. 2° E. to 4° S. 19° W.

*July*: 48° N. 23° W. to 45° N. 31° W.

**Temperature**: 16.<sub>01</sub>, mean of 41 obs., max. 22.<sub>1</sub>, min. 10 (exceptional cases 26.<sub>7</sub> and 5).

**Salinity**: 35.<sub>35</sub>, mean of 35 obs., max. 36.<sub>85</sub>, min. 32.<sub>01</sub>.

**Plankton-type**. Noted from the Mediterranean. The distribution in the Atlantic is on the whole eastern, from the W. of S. Africa to the Azores, the Bay of Biscay and the mouth of the Engl. Channel, thence (from May to December) across the Atlantic towards New York. Not seen N. of 50° N. — S.

**AMPHORELLA STEENSTRUPII (CLAP. & LACHM.)**

(JÖRGENSEN Bergens Mus. Aarbog 1899 N:o 2, pag. 12 Pl. I fig. 3.)

1898 *March*: 41° N. 21° W.; 32° N. 74° W.

*April*: 44° N. 45° W.; 42° N. 47° W.

*May*: 50° N. 14° W. to 48° N. 33° W.; 42° N. 61° W.

*June*: 50° N. 12° W.; 48°—45° N. 33°—41° W.

*July*: 49° N. 22° W.; 41° N. 58° W. to 40° N. 69° W.

*August*: 49° N. 13° W.; 48° N. 37° W. to 41° N. 65° W.

*September*: 48° N. 7° W.; 48°—47° N. 24°—33° W.

*November*: 45° N. 7° W.; 40°—48° N.; 31°—41° W.; 43°—42° 61°—64° W.

*December*: 48°—49° N. 40°—30° W.; 43° N. 61° W.

1899 *January*: 35° N. 9° W.; 40° N. 66° W.

*March*: 44° N. 16° W.; 37° N. 26° W.

*April*: 44° N. 15° W.

*May*: 50° N. 33° W.

*June*: 20° S. 1° E.; 3° S. 20° W.

*July*: 45°—40° N. 31°—38° W.; 48° N. 23° W.

*September*: 59° N. 5° E.

*November*: 51° N. 13° W. to 56° N. 24° W.

**Temperature**: 16.<sub>99</sub>, mean of 47 obs., max. 27.<sub>2</sub>, min. 8.

**Salinity**: 35.<sub>11</sub>, mean of 43 obs., max. 36.<sub>47</sub>, min. 31.<sub>84</sub>.

**Plankton-type**. Noted from the Mediterranean. It has been found, once, in the Florida Current, and, once, S.E. of St. Helena. Its principal area of distribution is between 40° and 50° N., across the Atlantic. — S.

### AMPHORELLA SUBULATA (Erb.)

(v. DADAY Mitth. Zool. St. Neapel Vol. VII 1887 p. 536 Pl. XVIII fig. 7.)

1898 *June*: 40° N. 10° W.

*September*: 59° N. 1° W.; 49° N. 3° W.

**Temperature**: 11.<sub>8</sub> to 17.<sub>2</sub>.

**Salinity**: 35.<sub>37</sub> to 35.<sub>46</sub> (evidently anomalous).

**Plankton-type**. This species is found in the Black Sea, the Mediterranean, the White Sea and the Baltic, (from Kiel to the Gulf of Finland and Kopparstenarna). Its rare occurrence in the ocean and its geographical distribution prove it to be a neritic form. — Ns and Nm.

### AMPHORELLA VITREA (BRANDT):

(*Tintinnus vitreus* Brandt Bibl. Zool. 1896 p. 54 Pl. III f. 8, 9.)

1899 *August*: 80° N. 16° E.

**Temperature**: — 0.<sub>3</sub>.

**Salinity**: 25.<sub>86</sub>.

**Plankton-type**. Noted from W. Greenland. — Ng.

**CODONELLA AMPULLA FOL.**

(Petalotricha amp. v. Dad. Mitth. Zool. Stat. Neapel Vol. VII, 1887, pag. 573

Pl. XXI fig. 7—12, 14, 17, 18).

1897 *December*: 45°—43° N. 13°—18° W.1898 *February*: 34° N. 74° W.*March*: 32° N. 32° W.; 12° N. 51° W.; 32° N. 74° W.*May*: 43° N. 43° W.*July and September*: Azores.*November*: 50° N. 31° W. to 47° N. 41° W.*December*: area between 34° N. 38° W., 44° N. 10° W., 50° N. 9° W. and 50° N. 20° W.; 43° N. 57° W1899 *January*: 48° N. 39° W.*May*: 25° S. 7° E.*June*: 17° S. 2° W.*November*: 49° N. 40° W.; 51° N. 34° W.**Temperature**: 16.<sub>89</sub>, mean of 19 obs., max. 25.<sub>8</sub>, min. 10.**Salinity**: 35.<sub>83</sub>, mean of 14 obs., max. 36.<sub>59</sub>, min. 34.<sub>04</sub>.**Plankton-type.** Noted from the Mediterranean. Its distribution in the Atlantic is essentially eastern, from the west of S. Africa to 50° N., but it has been found, although rarely, N. of S. America and in the Florida Current. — S.**CODONELLA CASSIS (HKL.)**

(Cyttarocydis cassis Fol. Arch. sc. phys. nat. 3. ser. Vol. V. pag. 22, 1881 Pl. I

fig. 6 — v. DADAY Mitth. Zool. Stat. Neapel Vol. VII, 1887, pag. 580

Pl. XXI fig. 3).

1898 *January*: 35° N. 74° W.*February*: 26°—30° N. 74° W.*March*: area between the Canaries, 41° N. 21°—23° W., 28° N. 38° W. and 23° N. 27° W.; 15° N. 49° W.*April*: 41° N. 19° W.; 12° N. 51° W.; 27° N. 75° W.*May*: 26° N. 42° W.; 46° N. 35° W. to 41° N. 51° W.*July*: 33° N. 74° W*October*: Azores; 21° S. 36° W.*November*: 51° N. 20° W.; area between the Canaries, 36° N. 14° W. and 26° N. 48° W.; 18°—19° S. 31° W.*December*: Azores to 25° N. 51° W.



1899 *February*: 32° N. 47° W.  
*March*: 36°—37° N. 29°—26° W.  
*May*: 35° N. 75° W.  
*June*: 14° S. 7° W.

**Temperature**: 19.<sub>86</sub>, mean of 45 obs., max. 25.<sub>9</sub>, min. 11.<sub>7</sub>.

**Salinity**: 36.<sub>51</sub>, mean of 34 obs., max. 37.<sub>48</sub>, min. 35.<sub>00</sub>.

**Plankton-type**. This species is found in the Mediterranean and occurs also in the Indian Ocean. It occurs in the Atlantic, more frequently in the eastern than in the western area, and especially between the Canaries, the Azores and the middle of the Sargasso Sea. Its northern limit is (in May) about 40°—45°, exceptionally 50°. — *D. (S.)*.

### CODONELLA LAGENULA (CLAP & LACHM).

(ENTZ. Mitth. Zool. Stat. Neapel. Vol. V. 1884 pag. 413 Pl. XXIV, fig. 11, 15, 16  
*C. galea* Hkl. *Dictyocysta polymorpha* Entz? *Codonella perforata* Entz?)

1897 *December* and

1898 *January*: 46° N. 11° W. to 7° N. 53° W.; 32° N. 74° W.

*February*: 26°—34° N. 73°—74° W.

*March*: Canaries; 41° N. 20° W. to 17° N. 47° W.; 28° N. 74° W.

*April*: 10°—15° N. 53°—49° W.

*May*: area between 17° N. 50° W., 21° N. 48° W. and 28° N. 47° W.; 48° N. 25° W. to 41° N. 56° W.

*June*: area between the Azores, 47° N. 32° W. and 30° N. 36°—52° W.

*July*: area between 49° N. 22° W., 41° N. 17° W. and 26° N. 48° W.; 40° N. 67° W.

*August*: mouth of the English Channel to the Newfoundland Banks; 40° N. 66° W.

*September*: area between the Azores, 46° N. 11° W. and 49° N. 21° W.

*October*: 48° N. 38° W.

*November*: Cape Verde Islands to the Canaries; area between the Azores, 26° N. 48° W. and 48° N. 29°—41° W.

*December*: Canaries; Azores; 50° N. 20° W.

1899 *January*: Canaries; 48° N. 39° W.

*February*: 32°—34° N. 47°—40° W.

*March*: round the Azores; 24° N. 40° W.

*April*: 38° N. 11° W.; 42° N. 18° W.; 32° N. 75° W.

*June*: 18° N. 46° W. to 36° N. 29° W.; 20° S. 2° E. to 3° S. 20° W.

*October*: 52° N. 21° W.

*November*: 51° N. 21° W.

**Temperature**: 20.<sub>27</sub>, mean of 94 obs., max. 28, min. 11.

**Salinity**: 35.<sub>24</sub>, mean of 60 obs., max. 37.<sub>50</sub>, min. 33.<sub>20</sub>.

**Plankton-type**. This species occurs in the Mediterranean and in the Indian Ocean. It is more frequent in the eastern than in the western Atlantic. Rare specimens may drift as far north as Bergen (JÖRGENSEN). — D. S.

#### CODONELLA MORCHELLA CL.

(Öfvers. af Kongl. Sv. Vetensk. Akad. Förhand. 1899 n. 10 pag. 969).

1898 *February*: 13° N. 70° W.

*August*: 41° N. 57° W.

*September*: 41° N. 65° W.

*November*: 36° N. 14° W.

**Temperature**: 17.<sub>5</sub> to 26.<sub>1</sub>.

**Salinity**: 34.<sub>33</sub> to 36.<sub>54</sub>.

**Plankton-type**. This species occurs in the Red Sea and Indian Ocean. — S. (D).

#### CODONELLA ORTHOCERAS HKL.

(v. DADAY: Mitth. Zool. Stat. Neapel Vol. VI, 1886, pag. 494, Pl. XXV. fig. 12.

*Codonella annulata* v. Dad. l. c. Vol. VII pag. 571 Pl. XX. fig. 21).

1897 *December*: 12° N. 50° W.

1898 *January*: 11° N. 20° W.; 15° N. 74° W.

*February*: Caribbean Sea; 21° N. 74° W. to 34° N. 73° W.

*March*: Canaries; Caribbean Sea.

*August*: 41°—42° N. 50°—51° W.

*October*: 42° N. 50° W.; 40° N. 67° W.

*November*: 36° N. 14° W.; 48°—50° N. 29°—20° W.; 42° N. 64° W.

*December*: Azores; 34° N. 38° W.

1899 *January*: Canaries.

*June*: 19° S. 1° W.

**Temperature**: 20.<sub>08</sub>, mean of 21 obs., max. 26.<sub>3</sub>, min. 16.<sub>8</sub>.

**Salinity**: 35.<sub>26</sub>, mean of 10 obs., max. 36.<sub>59</sub>, min. 32.<sub>51</sub>.

**Plankton-type**. Noted from the Canaries and the Mediterranean.

I have found it in a collection from Aden. It enters the Atlantic W. of S. Africa and occurs in the northern hemisphere round the Sargasso Sea. Its northern limit is about 50° N. — S.

### CODONELLA PUSILLA CL.

(Öfvers. af Kongl. Sv. Vetensk. Akad. Förh. 1899 n. 10 pag. 970).

1898 *October*: 41° N. 67° W.

*November*: 43° N. 61° W.; 51° N. 20° W. to 50° N. 31° W.

*December*: 45° N. 51° W. to 42° N. 63° W.

1899 *January*: 40° N. 66° W.

*April*: 46° N. 13° W.

*November*: 51° N. 21° W.

**Temperature**: 9 to 14 (exceptionally 5).

**Salinity**: 35 to 35.<sub>75</sub> (eastern Atlantic) or 32.<sub>01</sub> to 33.<sub>88</sub> (western Atlantic).

**Plankton-type**. — S.

### CODONELLA VENTRICOSA (CLAP. & LACHM.)<sup>1</sup>

(*Tintinnus ventricosa* Entz. Mitth. Zool. Stat. Neapel Vol. V, 1884, pag. 413, Pl. XXIV fig. 24),

1898 *June*: 40° N. 10° W.; 60° N. 8° W.

*August*: 50°—54° N. 10°—5° W.; 60° N. 2°—3° W.; Färöes; 40° N. 67° W.

*September*: 49°—50° N. 3°—10° W.; SW. of Iceland.

*October*: 49° N. 10°—20° W.

*November*: 51° N. 1°—10° W.; 36° N. 14° W.

*December*: 41° N. 66° W.

<sup>1</sup> Ostenfeld's data used.

1899-*March*: 49° N. 9° W.; 66° N. 19° W. to 65° N. 24° W.

*April*: 50° N. 6° W.

**Temperature**: 11.<sub>3</sub>, mean of 24 obs., max. 24, min. —1.<sub>2</sub>.

**Salinity**: 35.<sub>15</sub>, mean of 24 obs., max. 36.<sub>54</sub>, min. 34.<sub>18</sub> (common).

**Plankton-type**. Noted from the Mediterranean. It occurs in the Atlantic from Gibraltar and the coast of Portugal to the Engl. Channel, Scotland and Iceland (passing round this island) as well as in the North Sea, the White Sea and the western Baltic. It occurs also E. of New York. — *Nm. Ns.*

### CYTTAROCYLIS ACUMINATA v. DAD.

(Mitth. Zool. Stat. Neapel. Vol. VII, 1887. pag. 578 Pl. XII, fig. 33.)

1898 *January*: 24° N. 40° W. to 7° N. 53° W.

*February*: Caribbean Sea; 13° N. 70° W. to 30° N. 74° W.

*March*: 28° N. 74° W.; Azores to 7° N. 55° W.; 23°—26° N. 28°—29° W.

*April*: 10° N. 53° W.; 27° N. 75° W.

*May*: area between 29° N. 39° W., 6° N. 56° W. and 23° N. 56° W.; 43° N. 45° W. to 42° N. 61° W.

*June*: Canaries; area between the Azores, 36° N. 44° W., 22° N. 60° W. and 23° N. 42° W.; 42° N. 50° W.

*July*: Azores; 25° N. 48° W. to 31° N. 39° W.; 41° N. 48° W. to 40° N. 67° W.

*August*: Azores; 48° N. 24° W. to 41° N. 65° W.

*September*: area between 31° N. 33° W., 50° N. 11° W. and 46° N. 39° W.

*October*: Azores; 21° S. 36° W.

*November*: 24°—26° S. 29°—30° W.; 5° S. 33° W. to the Canaries; Azores; 26° N. 48° W.; 48° N. 29° W. to 42° N. 64° W.

*December*: S. of Rio Janeiro; Canaries; Azores; 34° N. 38° W.; Caribbean Sea.

1899 *January*: Canaries.

*May*: 29° S. 9° E. to 24° S. 7° E.

*June*: 24° S. 6° E. to 10° S. 11° W.; 21° N. 45° W.

*July*: 25° N. 37° W.; 45° N. 31° W.

**Temperature:** 22.6, mean of 101 obs., max. 27.2, min. 9.7.

**Salinity:** 35.95, mean of 78 obs., max. 37.43, min. 33.20.

**Plankton-type.** This species occurs in the Mediterranean and the Indian ocean. Its range of distribution in the Atlantic is between 29° S. and (in May to November) 40°—50° N. It is stationary at the Azores. — *D. S.*

### CYTTAROCYLIS AMOR CL.

(Öfvers. K. Sv. Vetensk. Akad. Förh. 1899 n. 10, pag. 970.)

1897 *December* and

1898 *Januari:* 7° N. 53° W. to 18° N. 46° W.; 26°—35° N. 74° W.; 32° N. 33° W.

*Februarg:* Carribean Sea; Antilles Current.

*March:* Carribean Sea; 41° N. 21° W.

*April:* 7°—10° N. 55°—51° W.

*May:* 27° N. 48° W.; 32° N. 36° W.; 45° N. 42° W.

*June:* the Canaries and the Azores to 42° N. 50° W.; 50° N. 12° W.; 30° N. 52° W.

*July:* 29°—26° N. 44°—48° W.; 40° N. 67° W.

*August:* 40° N. 59°—66° W.

*September:* 33°—35° N. 31°—30° W.; 17°—20° N. 48°—45° W.; Bahamas; 42° N. 57° W.

*October:* Azores; 41°—42° N. 59°—50° W.

*November:* Canaries to 5° S. 33° W.

*December:* Canaries; Carribean Sea.

1899 *April:* 32°—36° N. 75°—74° W.

*June:* 12°—21° N. 52°—45° W.; 3° S. 20° W. to 19° S. 1° W.

*July:* S.W. of the Cape Verde Islands.

**Temperature:** 23.8, mean of 65 obs., max. 28, min. 13.4, exceptionally 11.7.

**Salinity:** 36.09, mean of 43 obs., max. 37.05, min. 34.88, exceptionally 32.51.

**Plankton-type.** This species occurs in the Indian Ocean. — *D.*

**CYTTAROCYLIS (?) CALYPTRA CL.**

(*Tintinnus*? CL. Kongl. Sv. Vetensk. Akad. Handl. Vol. XXXII n. 3, pag. 24.

Pl. I fig. 2.)

1898 *August*: 76° N. 11° E.

**Temperature:** 5.4.

**Salinity:** 35.08.

**Plankton-type.** This species was found very sparingly among Styli-plankton. — S. ?

**CYTTAROCYLIS DENTICULATA (EBB.).<sup>1</sup>**

(*C. denticulata*, *C. media*, *C. gigantea*, *C. edentata* BRANDT Bibl. Zool. H. 20 Lfg. 2. 1896. *C. elegans*, *C. obtusangula* Ostenf. Zool. Anzeiger Vol. XXII n. 601 pag. 437 *C. d. v. obtusa* Auriv. Conf. JÖRGENSEN: Bergens Museums Aarhog 1899.)

1898 *January and February*: 37° N. 73° W.

*March*: 61° N. 11°—26° W.

*April*: NW. and S. of Iceland; Färöe Channel; Shetlands; N. of Rockall; 59° N. 22°—28° W.; 57°—58° N. 43°—50° W.; 42° N. 47° W. to 43° N. 50° W.

*May*: between Jan Mayen and Greenland; S. of Iceland; Färöes; 58° N. 2°—5° E. to 66° N. 9° E.; area between Scotland, 63° N. 38° W. and 57° N. 28° W.; 42° N. 50° W. to 40° N. 72° W.

*June*: N. and S. of Iceland; Färöes to 62° N. 2° E.; N. Scotland to the north of Rockall; 67° N. 10° E. to Tromsøe; Beeren Island; S. and S.E. of Spitzbergen; 57° N. 34°—38° W.; S. of Cape Farewell to Disco.

*July*: 77°—78° N. 0° W.—7° E.; round Iceland; Iceland to the Färöes; Färöe Channel to the Shetlands and to 59° N. 21° W.; Irminger Sea; 57° N. 47° W.

*August*: round Iceland; Iceland to the Färöes and the Shetlands; Irish Channel; E. of Greenland (70° to 66° N.); Denmark's Sound; Davis's Strait to Disco; 42° N. 48° W. to 52° N. 55° W.

*September*: round Iceland, thence to the Färöes and Scotland; 71°—76° N. 20°—0° E.; Denmark's Sound; 55° N. 35° W.; W. Greenland from 65° N. to Disco; Davis's Strait.

<sup>1</sup> Ostenfeld's data used.

*October*: Iceland to the Färöes and Scotland; 57°—58° N. 27°—32° W. to Greenland and Davis's Strait; 42° N. 50° W. to 41° N. 67° W.

*November*: S. Iceland to the Färöes, the Shetlands and Scotland; 51° N. 20° W., common; 60° N. 34° W.; 55° N. 36° W. to 40° N. 67° W.

*December*: N. of Scotland; 48° N. 40° W. to 43° N. 61° W.<sup>1</sup>

1899 *January*: Färöes, rare; 40° N. 66° W. to 41° N. 69° W.

*March*: 64° N. 10° W.

*May*: 60° N. 4° W. to 64° N. 10° W., rare to common; 66° N. 24° W., rare; 47° N. 57° W.

*June*: Jan Mayen and 70° N. 13° W., not common; 67° N. 3° W. (rare) to 63° N. 1° E. (very common); 62° N. 2° E., very common; 64°—66° N. 7°—10° E.; 70° N. 20° E. to Beeren Island; 78° N. 12° E.

*July*: 73° N. 21° W., rare; 80° N. 14° E., rare; 71° N. 32° E.; 57° N. 31° W.

*August*: 73° N. 22°—24° W., rare; 72° N. 26° E. to 76° N. 41° E.; 80° N. 51° 30' E., rare; 54° N. 46° W.; 52° N. 53° W.

*September*: 80° N. 16° E. to 79° N. 10° E. and thence to 72° N. 19° E., as a rule common; 56° N. 38° W. to 52° N. 55° W., more or less rare.

*October*: 54° N. 45° W., not rare.

*November*: 53° N. 43° W. to 47° N. 51° W., rare.

**Temperature:** 8.8, mean of 63 obs., max. 14, min. 2.7 (only such samples as contained this species abundantly have been considered).

**Salinity:** 34.74, mean of 63 obs., max. 35.59, min. 31.96.

**Plankton-type.** This species occurs in the Bering Sea. The somewhat high salinity indicates that this species occurs both in Tricho- and Chæto-plankton. — *T. (C.)*

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<sup>1</sup> Misprint in my paper: Öfvers. 1899 p. 796, where 33° N. is given.

## CYTTAROCYLIS HEBE CL.

(Öfvers. Kongl. Vet. Akad. Förh. 1899 n. 10 pag. 971).

1898 *January*: 32°—35° N. 74° W.*February*: 26°—30° N. 74° W.*March*: 28°—32° N. 74° W.*April*: 27°—31° N. 75° W.*May*: 28°—29° N. 47°—39° W.; 43° N. 43°—44° W.*June*: 23° N. 42° W.; 29° N. 36° W.; Azores; 48° N. 33° W.*July*: 29° N. 43° W. to the Azores; 41° N. 17° W.; 48° N. 30° W.; 42° N. 48° W. to 40° N. 67° W.*August*: Azores; 50° N. 10° W.; 44° N. 42° W. to 40° N. 67° W.*September*: 27° N. 36° W. to 48° N. 7° W.; 48° N. 30° W.; 46° N. 39° W.; 42° N. 57° W.; 41° N. 65° W.*October*: 41°—42° N. 59°—50° W.*November*: 26°—24° S. 29°—30° W.; 5° S. 33° W.; 43° N. 61° W.; 42° N. 64° W.; 47°—48° N. 41°—29° W.; Canaries; 24° N. 21° W.*December*: 22° N. 56° W.1899 *March*: 24° N. 40° W.; 35° N. 16° W.*April*: 32° N. 75° W.*May*: 24° S. 7° E.; 35° N. 75° W.*June*: 24° S. 6° E.; 21°—24° N. 45°—42° W.; Azores.*July*: 36° N. 39° W. to 46° N. 29° W.*November*: 51° N. 21° W., rare.**Temperature**: 21.2, mean of 88 obs., max. 28, min. 10.**Salinity**: 35.58, mean of 71 obs., max. 37.63, min. 32.51.

**Plankton-type.** This species occurs in the Red Sea and in the Indian Ocean. In the Atlantic it occurred in the tropical and subtropical region, in the winter and spring (June) to about 35°—40° N. In July—September it had advanced beyond 40° N. towards Nova Scotia and Newfoundland, in August—September towards the English Channel. In November it was seen in the region of the Canaries. — *D.*



## CYTTAROCYLIS HEBE VAR. APOPHYSATA CL.

(Öfvers. af Kongl. Sv. Vetensk. Akad. Förh. 1899 n, 10 pag. 971).

1897 *December* and

1898 *January*: 17°—15° S. 38°—37° W.; 7° N. 22° W.; 11° N. 52° W. to 32° N. 33° W.; Caribbean Sea; 32°—35° N. 74° W.

*February*: Caribbean Sea; Bahamas.

*March*: 3°—6° N. 24°—22° W.; 9°—10° N. 53°—59° W. to 22° N. 43° W.

*April*: 7°—12° N. 55°—51° W.; Caribbean Sea.

*May*: area between 11° N. 52° W., 26° N. 42° W. and 26° N. 52° W.; 42° N. 61° W. to 45° N. 42° W.; 48° N. 26°—30° W.

*June*: Madeira; Azores; 25° N. 52° W.

*July*: 25°—38° N. 74° W.; 40° N. 67° W.; Azores.

*August*: 22°—38° N. 74° W.; 40° N. 66° W. to 42° N. 56° W.; Azores.

*September*: 8°—18° N. 25° W.; 9° N. 53° W.; 41° N. 65° W.; Azores; 44°—46° N. 16°—14° W.

*October*: Caribbean Sea; 26°—30° N. 76°—74° W.; 41° N. 59° W.

*November*: 9° S. 34° W.; 4° N. 30° W.; 17° N. 25° W.; 19° N. 58° W.

*December*: 26° S. 45° W.; 14° S. 26° W.; Caribbean Sea; 28° N. 47° W.

1899 *March*: 18°—21° N. 45°—43° W.

*June*: 14°—11° S. 6°—10° W.; 12°—15° N. 52°—50° W.; 27° N. 39° W.

*July*: 23° N. 36° W.; 38° N. 39° W.

**Temperature**: 23.7, mean of 84 obs., max. 28.2, min. 9.7.

**Salinity**: 35.93, mean of 62 obs., max. 38.54, min. 32.96.

**Plankton-type**: D.

**CYTTAROCYLIS NORVEGICA** (v. DAD.).<sup>1</sup>

(JÖRGENSEN: Bergens Museums Aarbog 1899 n. 11 pag. 28 Pl. I fig. 10).

1898 *April*: 43° N. 50° W.; 63° N. 18° W.; 66° N. 24° W.*May*: 43° N. 52° W.; 68° N. 21° W.; 63° N. 17° W.*June*: S.E. Iceland to Scotland; 62° N. 2° 30' E.; 57° N. 34° W. to S.W. of Greenland; Davis's Strait to Disco.*July*: S. Iceland to the Färöes and 61° N. 4° W.; 60° N. 4°—8° W.; 57° N. 47° W.*August*: round Spitzbergen; S. Iceland to the Shetlands; E. Greenland.*September*: Spitzbergen to Beeren Island; 58° N. 39° W. to S.W. of Greenland; W. Greenland to Disco.*October*: 61°—62° N. 5°—7° W.; 57° N. 27° W.; 58° N. 48° W.*November*: 48°—42° N. 49°—64° W.*December*: 43° N. 61° W. to 42° N. 49° W. and to 45° N. 53° W.1899 *January*: 40°—41° N. 66°—69° W.*March*: 65° N. 24° W.*May*: 61° N. 5°—6° and 20° W.*June*: 72°—75° N. 19°—17° E.*July*: 75° N. 14° E.; 74° N. 20° W.; 52° N. 54° W.*September*: 73°—78° N. 19°—12° E.; 54° N. 48° W.; 47° N. 51° W.**Temperature**: 5.6, mean of 45 obs., max. 16, min. 0.9.**Salinity**: 34.22, mean of 44 obs., max. 35.37, min. 31.96, exceptionally 26.51.**Plankton-type**. Arctic species. — *T* (Ns. Ng.).**CYTTAROCYLIS SERRATA** (MOEB.)(JÖRGENSEN: Bergens Museums Aarbog 1899 N. 2. Pl. I fig. 11—12. *Ptychocylis Ehrenbergii* Cl. Kongl. Vet. Akad. Handl. Vol. XXXII n. 8 pag. 16).1898 *January*: 12° N. 19° W.*June*: 40°—42° N. 10°—9° W.*August*: 58° N. 7° W.1899 *May*: 33° S. 16° E.<sup>1</sup> Ostenfeld's data used.

**Temperature:** 16.<sub>4</sub>, mean of 5 obs., max. 22, min. 12.

**Salinity:** 34.<sub>88</sub> to 35.<sub>51</sub>.

**Plankton-type.** The rare occurrence of this species in the ocean, where it is always to be seen near the coasts, indicates that it is a neritic form. The above statements show that it occurs along the eastern coasts, from the Cape of Good Hope to Scotland. — *Nm.*

### CYTTAROCYLIS SIMPLEX CL.

(Öfvers. af Kongl. Sv. Vet. Akad. Förh. 1899 n. 10 pag. 972).

1897 *December:* 19° N. 45° W.; 32° N. 33° W.

1898 *April:* 31° N. 75° W.

*June:* 37° N. 29° W.; 30° N. 52° W.; 10° N. 53° W.

*July:* 33° N. 74° W.

*August:* 42° N. 62° W.

*September:* 56° N. 12° W.; 41° N. 65° W.

*October:* 41° N. 67° W.

*November:* 56° N. 23° W.; 50° N. 31° W.; 41°—43° N. 69°—61° W.

1899 *June:* 20° S. 1° E.

**Temperature:** 19.<sub>8</sub>, mean of 16 obs., max. 27.<sub>2</sub>, min. 10.<sub>8</sub>.

**Salinity:** 35.<sub>22</sub>, mean of 14 obs., max. 36.<sub>71</sub>, min. 32.<sub>20</sub>.

**Plankton-type.** *D.*

### CYTTAROCYLIS TREFORTI V. DAD.<sup>1</sup>

(Mitth. Zool. Stat. Neapel Vol. VII 1887 pag. 579 Pl. XXI fig. 1).

1897 *December:* 32° N. 33° W. to 45° N. 13° W.

1898 *January:* 27° N. 37° W.; 46° N. 11° W.; 25°—32° N. 74° W.

*February:* 26°—30° N. 74° W.

*March:* 25° N. 41° W.; 28° N. 74° W.; 43°—45° N. 48°—36° W.

*May:* 43° N. 11° W.; 50° N. 14° W.; 41° N. 56° W.

*June:* 44° N. 9° W.

*July:* 48° N. 30° W.; 26° N. 48° W.; 21° N. 58° W.

*August:* Azores; 48° N. 24° W.; 56° N. 20° W.; 40° N. 66° W.

<sup>1</sup> The Atlantic form differs from the Mediterranean in the absence of the apophysis on the apical spine.

*September*: 50° N. 9° W. to 56° N. 14° W.; 38° N. 74° W.

*October*: 56° N. 25° W.; 42° N. 50° W.; 41° N. 59° W.

*November*: 45° N. 7° W.; 48° N. 29° W.; 47°—48° N. 41° W.;  
43° N. 61° W.

*December*: Azores; 38° N. 29° W.; 41° N. 66° W.

1899 *March*: 47° N. 8° W.

*April*: 44° N. 15° W.; 32° N. 75° W.

*May*: 51° N. 14° W.; 25° S. 7° E.

*September*: 56° N. 24° W.; 57° N. 16° W. (very abundant).

*October*: 56° N. 15° W. (rare).

*November*: 51° N. 21° W.

**Temperature**: 17.<sup>45</sup>, mean of 47 obs., max. 27.<sup>5</sup>, min. 8.

**Salinity**: 35.<sup>45</sup>, mean of 31 obs., max. 37.<sup>04</sup>, min. 32.<sup>51</sup>.

**Plankton-type**. Noted from the Mediterranean. As this species has been seen W. of S. Africa, it probably enters the Atlantic W. of the Cape of Good Hope. In the northern hemisphere it has been only rarely met with in the Sargasso Sea. The principal areas of distribution are the Antilles and Florida Currents and from 40° N. 65° W. to the Azores and the European coast to about 50° N. Beyond this limit rare specimens may drift to 60° N. The abundant occurrence in September 1899 at 57° is therefore a remarkable exception. — *S. (D.)*

### DICTYOCYSTA ELEGANS EHB.<sup>1</sup>

(MOEBIUS: Fünfte Ber. der Komm. z. Wissensch. Unters. d. Deutschen Meere Pl VIII fig. 28. *D. mitra* Entz. Mitth. d. Zool. Stat. zu Neapel Vol. VI, 1886, Pl. XIV fig. 22. *D. templum* Entz. l. c. Pl. XIV fig. 18—21, 23; v. DADAY Mitth. d. Zool. Stat. zu Neapel Vol. VII, 1887, Pl. XXI fig. 8, 9.)

1898 *January*: 41° N. 21° W. to 46° N. 11° W.; 61° N. 8° W.,  
very rare; 32°—35° N. 74° W.

*February*: 63° N. 17° W.; 30°—34° N. 74°—73° W.

*March*: 28° N. 38° W. to 48° N. 6° W.; 49° N. 33° W.; 62°  
N. 2° E.

*April*: area between the Azores, the Engl. Channel and 45° N.  
43° W.

<sup>1</sup> Ostenfeld's data used.

- May*: area between 40° N. 16° W., 50° N. 7° W. and 42° N. 61° W.; 60° N. 10° W.; S. of Iceland.
- June*: 39° N. 39° W.; 44° N. 16° W.; 50° N. 12° W.
- July*: 48° N. 30° W.; 49° N. 22° W.; 59° N. 23° W.; 42° N. 48° W. to 40° N. 69° W.
- August*: 50° N. 12° W. to 49° N. 20° W.; 56° N. 20° W.; Färöe Channel; SW. of the Färöes; W., SW. and S. of Iceland; 44° N. 48° W. to 40° N. 67° W.
- September*: area between 47° N. 7°—9° W., 48° N. 24° W., 56° N. 36° W., 60° N. 26° W., the Shetlands and 57° N. 12° W.; S. and N. of Iceland.
- October*: area between 58° N. 35° W., SW. Iceland, N. Scotland, NW. Iceland and 56° N. 31° W. (maximum at 57°—60° N. 27°—21° W.); 41° N. 59° W.
- November*: Cape Verde Islands; area between 55°—56° N. 21°—23° W., 49° N. 31° W., 53° N. 49° W. and 47° N. 41° W.; S. Iceland towards the Shetlands, rare; 42° N. 61° W. to 41° N. 69° W.
- December*: 48° N. 19° W. to 45°—41° N. 66° W.
- 1899 *January*: area between the Canaries, Madeira and Gibraltar; at some few points between 50° N. 20° W. and 41° N. 69° W.
- March*: 30° N. 35° W.; 35° N. 16° W.; 46° N. 11° W., everywhere rare.
- April*: area between 41° N. 17° W., 47° N. 8° W. and 42° N. 18° W.
- May*: 25° S. 7° E.; 30° N. 35° W.; 50° N. 33° W.; 51° N. 14° W.
- June*: 20° S. 2° E. to 4° S. 19° W.
- July*: 12°—14° N. 27°—28° W.
- September*: 57° N. 16° W. to 56° N. 30° W., rare.
- October*: area between 52°—56° N. 14°—15° W. and 53° N. 37° W., rare.
- November*: 51° N. 13°—28° W., not rare; 52° N. 43°—48° W., rare.

**Temperature**: 13.<sub>2</sub>, mean of 16 obs., max. 22, min. 7.<sub>2</sub> (only such samples considered as contained this species to any amount).

**Salinity**: 35.<sub>38</sub>, mean of 16 obs., max. 36.<sub>47</sub>, min. 34.<sub>56</sub>.

**Plankton-type.** This species occurs in the Mediterranean the Red Sea and Indian Ocean. It enters the Atlantic west of S. Africa and has been seen to the region of Ascension, Cape Verde, Canaries and the Azores. In April (1898) it reached  $45^{\circ}$  N., in May it touched S. Iceland. It was seen in September N. of Iceland. — S.

### DICTYOCYSTA MITRA H<sub>KL</sub>.

(v. DADAY: Mitth. d. zool. Stat. Neapel Vol. VI, 1886, Pl. XXV fig. 16).

1897 *December* and

1898 *January*:  $32^{\circ}$  N.  $33^{\circ}$  W. to  $43^{\circ}$  N.  $18^{\circ}$  W.

*March*: area between  $45^{\circ}$  N.  $36^{\circ}$  W.,  $44^{\circ}$  N.  $17^{\circ}$  W., the Canaries and  $30^{\circ}$  N.  $35^{\circ}$  W.

*April*:  $48^{\circ}$  N.  $29^{\circ}$  W

*May*: area between  $43^{\circ}$  N.  $45^{\circ}$  W.,  $49^{\circ}$  N.  $17^{\circ}$  W. and  $38^{\circ}$  N.  $21^{\circ}$  W.

*June*:  $48^{\circ}$  N.  $33^{\circ}$  W.;  $37^{\circ}$  N.  $26^{\circ}$  W.

*July*:  $38^{\circ}$  N.  $25^{\circ}$ — $26^{\circ}$  W.

*August*: Azores;  $40^{\circ}$  N.  $66^{\circ}$  W.

*September*:  $48^{\circ}$  N.  $24^{\circ}$  W.;  $42^{\circ}$  N.  $57^{\circ}$  W. to  $41^{\circ}$  N.  $65^{\circ}$  W.

*October*:  $41^{\circ}$  N.  $59^{\circ}$  W.

*November*:  $34^{\circ}$  N.  $10^{\circ}$  W.;  $48^{\circ}$  N.  $29^{\circ}$  W. to  $42^{\circ}$  N.  $64^{\circ}$  W.

*December*:  $49^{\circ}$  N.  $30^{\circ}$  W. to  $41^{\circ}$  N.  $66^{\circ}$  W.

1899 *January*:  $45^{\circ}$  N.  $49^{\circ}$  W.

*March*:  $33^{\circ}$  N.  $32^{\circ}$  W.

*May*:  $35^{\circ}$  N.  $75^{\circ}$  W.;  $25^{\circ}$  S.  $7^{\circ}$  E.

*June*:  $20^{\circ}$  S.  $2^{\circ}$  E. to  $14^{\circ}$  S.  $6^{\circ}$  W.

*October*:  $53^{\circ}$  N.  $37^{\circ}$  W., rare.

*November*:  $51^{\circ}$  N.  $34^{\circ}$  W., rare.

**Temperature:**  $17.76$ , mean of 50 obs., max. 23, min 8.

**Salinity:**  $35.51$ , mean of 36 obs., max.  $36.68$ , min.  $33.98$ .

**Plankton-type.** This species occurs in the Benguela Current, W. of S. Africa, and its principal area of distribution in the northern hemisphere is between the Canaries, the Azores, S.W. of Ireland and the Newfoundland Banks. — S.

**FUNGELLA ARCTICA** CL.

(Kongl. Sv. Vetensk. Akad. Handl. Vol. XXXII n. 3 pag. 22, Pl. I, fig. I.  
 Vanhöffen: Fauna und Flora Grönlands. Pl. VI, fig. 1—2 »Statoblast»).

1898 *August*: 80° N. 17° E.

**Temperature**: 3.5.

**Salinity**: 33.59.

**Plankton-type.** This organism has been found by Vanhöffen in Karajakfjord (West Greenland), and by me on the coasts of Denmark, Holland and England. — *Ng?*

**LEPROTINTINNUS BRANDTII** (NORDQUIST).

(CL. Öfvers. af Kongl. Sv. Vet. Akad. Förh. 1899 n:o 10, pag. 973).

1898 *March*: 7° N. 55° W., abundant.

**Temperature**: 25.9

**Plankton-type.** This species occurs in the Baltic, where NORDQUIST found it in the Bay of Bothnia to 61° 8' N. and in the Gulf of Finland (September, October), and AURIVILLIUS at Sydostbrotten (September). Most Baltic species are of arctic origin, and the occurrence of this species N. of South America is thus very remarkable. It is therefore questionable to what type this species belongs, but in any case it is a *neritic* form.

**PORELLA APICULATA** CL.

(Öfvers. Kongl. Vetensk. Akad. Förh. 1899 n. 10, pag. 973).

1899 *June*: 20° S. 2° E.

**Temperature**: 20.7.

**Salinity**: 36.01.

**Plankton-type**: S?

**PTYCHOCYLIS ACUTA** BRANDT<sup>1</sup>.

(Biblioth. zool. Heft 20, 1896, pag. 59, Pl. III fig. 16. Pt. *urnula* var. *minor*.  
 Jörgens. Bergens Museums aarbog. 1899, n. 2. Pl. I fig. 9).

1898 *March*: 58° N. 6° E.

*May*: 60° N. 31° W.

<sup>1</sup> Ostenfeld's data for *P. urnula* used.

*June*: S. and S.E. of Iceland; 67° N. 10° E.; 57° N. 42° W.

*July*: along the S. coast of Iceland to the Färöes; 60° N. 17° W. to 57° N. 47° W.

*August*: S.W. and S. of Iceland; Färöes to 61° N. 4° W.; 54° N. 5° W.; W. of Spitzbergen; 60° N. 53° W.

*September*: N. of Iceland; 65° N. 36° W. to the S. of Iceland; 56° N. 26° W.; between Spitzbergen and Norway.

*October*: along the S. coast of Iceland to the Färöes and 61° N. 5° W.; area between 58° N. 32° W., 57° N. 42° W. and 54° N. 45° W.; 41° N. 67° W.

*November*: S. Iceland to the Färöes; Färöe Channel; 51° N. 20° W.; area between 53° N. 31°—49° W., 56° N. 36° W. and 46° N. 46° W., very common; 42° N. 64° W. to 41° N. 69° W.

*December*: Färöes; 48° N. 40° W. to 51° N. 66° W.

1899 *January*: 40°—41° N. 66°—69° W.

*July*: 57° N. 31° W.

*August*: 55° N. 26° W., rare.

*September*: 72° N. 19° E., very rare; 56° N. 30° W. to 53° N. 51° W., rare to common.

*October*: 53°—56° N. 37°—38° W., common; 54° N. 45° W., not rare.

*November*: 49° N. 40° W. to 52° N. 48° W., as a rule, rare.

**Temperature**: 9, mean of 68 obs., max. 18.2, min 5.5.

**Salinity**: 34.51, mean of 64 obs., max. 35.43, min. 31.96.

**Plankton-type**. The principal area of distribution is the area between Iceland, Scotland and Greenland, whence it spreads to the North Sea and the Scandinavian coasts as well as to the Newfoundland Banks. It is then to be considered a boreal, although not strictly an arctic form. — *Ns* (*T*).

### PTYCHOCYLIS ARCTICA BRANDT.

(Biblioth. zool. Heft. 20, 1896, pag. 61, Pl. III, fig. 17).

1898 *January*: 37° N. 73° W.

*November*: 48° N. 49° W.

1899 *July*: 75° N. 49° E.

*August*: 71° N. 23° W.



**Temperature:** 2.6 to 9.4.

**Salinity:** 32.58, one obs.

**Plankton-type:** *Ng.*

### PTYCHOCYLIS OBTUSA BRANDT<sup>1</sup>

(Bibl. zool. Heft. 20, 1896, pag. 59, Pl. III, fig. 15. P. DRYGALSKII BRANDT  
l. c. fig. 14).

1898 *April:* 73° N. 5° W.; 57° N. 43° W.; 62° N. 50° W.; 43° N. 50° W.

*May:* 71° N. 14° W.

*June:* area between 74° N. 23° E., 77° N. 17° E. and 77° N. 27° E.

*August:* round Spitzbergen.

*September:* Beeren Island; N. of Iceland; Disco.

*November:* 51° N. 20° W.; 49° N. 22° W.; 52° N. 37° W. to 45° N. 52° W.

*December:* 42° N. 49°—63° W.

1899 *January:* 45° N. 49° W. to 43° N. 57° W.

*March:* 66° N. 24° W.

*June:* 69°—70° N. 13° W.; Tromsøe to the west of Spitzbergen.

*July:* 74° N. 20° W.; 79°—80° N. 10°—14° E.

*August:* 72° N. 26° E. to 78° N. 47° E.

*September:* 81° N. 16° E. to 79° N. 10° E., thence to 73° N. 18° E.; 52° N. 55° W., rare.

**Temperature:** 3.5, mean of 19 obs., max. 11.0; min. — 0.9.

**Salinity:** 33.39, mean of 19 obs., max. 35.03, min. 32.01.

**Plankton-type.** This species is decidedly arctic, and the low mean salinity indicates that it is essentially a neritic form. It is therefore very remarkable that it was found in November as far south in the eastern Atlantic as 50° N. 20°—22° W. — *Ng.*

<sup>1</sup> Ostenfeld's data used.

**TINTINNOPSIS BEROIDEA STEIN<sup>1</sup>.**

(JÖRGENSEN: Bergens museums aarbog 1899 n. 2, Pl. I, fig. 5.

*T. beroidea* var. *acuminata* v. Dad., *Auric.*, Cl.)1898 *January*: 6° N. 55° W.*February*: 34° N. 73° W.*May*: 60° N. 10° W.*July*: 60° N. 3° W.*August*: 47° N. 39° W.; 48° N. 30° W.; 55° N. 5° W.; 64° N. 21° W.; 40° N. 67° W.*October*: Vestmannaö to 63° N. 12° W.; 59° N. 3° W.; 44° N. 43° W. to 41° N. 59° W.*November*: N. of Scotland; 56° N. 26° W.1899 *March*: 49° N. 9° W.*April*: 49° N. 7° W.**Temperature**: 8 to 25.**Salinity**: 32.50 to 35.65.**Plankton-type.** This species is evidently a neritic form of wide distribution — *Ns*, in the northern Atlantic.**TINTINNOPSIS CAMPANULA (EHB.)**

(Tintinnus camp. Clap. &amp; Lachm. Etudes sur les infus. pag. 207, Pl. VIII, fig. 9.

*Tintinnopsis cincta* v. Daday Mitth. d. Zool. Stat. zu Neapel, Vol. VII, 1887, Pl. XX, fig. 6—8).1898 *August*: 54° N. 5° W.*September*: 9° N. 53° W.*November*: 51° N. 1° W.**Temperature**: 13.5 to 28.**Salinity**: 34.05 to 34.55.**Plankton-type.** This species is found in the Mediterranean and Adriatic, southern North Sea, southwestern Baltic and the Bermudas (Plankt. Exp.). It scarcely occurs in the open ocean and therefore belongs to the neritic plankton. — *Nm* (*Nt*).<sup>1</sup> Ostenfeld's data used.

**TINTINNOPSIS KARAJACENSIS BRANDT.**

(Bibl. zool. Heft. 20, 1896, Pl. III, fig. 5).

1898 *September*: 69° N. 53° W. (Ostenfeld).1899 *September*: 81° N. 16° E., not rare.**Temperature**: 2.7 (Ostenf.).**Salinity**: 32.45 (Ostenf.).**Plankton-type**. *Ng*.**TINTINNUS ACUMINATUS CLAP & LACHM.<sup>1</sup>**(*T. Möbii* Brandt. *T. secatus* Brandt, Bibl. zool. 1896, pag. 51, fig. 12.

JÖRGENSEN, Bergens Mus. aarhog 1899, n. 2, pag. 8).

1898 *March*: 37° N. 74° W.*April*: 59° N. 22° W.; 62° N. 2° E.*May*: 58° N. 21° W.*June*: 60° N. 4° W.*July*: S. of Iceland to 63° N. 14° W.; Shetlands.*August*: Denmarks Sound; S.E. of Iceland; Färöe Channel; W. and N. of Spitzbergen.*September*: W. of Iceland to Greenland; 65° N. 55° W.; Färöe Channel; 76° N. 13° E.*October*: area between S. Iceland, 56° N. 12° W. and 58° N. 32° W.*November*: S. Iceland to 60° N. 4° W.; 56° N. 23°—36° W.; 47° N. 41° W. to 41° N. 69° W.*December*: 42° N. 49° W. and 46° N. 50° W. to 41° N. 66° W.1899 *January*: 45° N. 50° W. to 41° N. 69° W.*March*: 62° N. 8° W.*September*: 73° N. 18° E.; 80° N. 13° E.**Temperature**: 9.8, mean of 28 obs., max. 14.4, min. 3.34, exceptionally 23.**Salinity**: 34.03, mean of 27 obs., max. 35.42, min. 31.69.**Plankton-type**. This species is a boreal, but not strictly an arctic form. Its principal area of distribution is the Irminger Sea. — *T* (*Ns*).<sup>1</sup> Ostenfeld's data for *T. Möbii* and *T. secatus* used.

**TINTINNUS FRAKNOI** v. DADAY.

(Milth. d. zool. Stat. zu Neapel, Vol. VII, 1887, pag. 528, Pl. XVIII, fig. 1).

1897 *December* and

1898 *January*: 7° N. 53° W.; Caribbean Sea; 22° N. 42° W.; 43°—45° N. 18°—13° W.

*February*: Caribbean Sea; Bahamas.

*March*: area between 3° N. 24° W., Cape Verde and Cape Verde Islands; Canaries; Azores to 45° N. 13° W.; 23° N. 42° W. to 14° N. 50° W.; Caribbean Sea; 28°—32° N. 74° W.

*April*: 7° N. 55° W. to 10° N. 53° W.; 27° N. 75° W.; 41° N. 19° W.; 47° N. 40° W.

*May*: area between the Azores, 41° N. 16° W., 49° N. 23° W. and 48° N. 33° W.; 41° N. 51° W.

*June*: Canaries; Azores; Cape Finisterre; 42°—45° N. 50°—41° W.; 23° N. 42° W. to 30°—33° N. 51°—48° W.

*July*: area between de Azores, 41° N. 17° W., 49° N. 22° W. and 40° N. 67° W.; 25° N. 48° W.; Caribbean Sea.

*August*: Azores; abundantly across the whole Atlantic from the English Channel to 40° N. 66° W.; Shetlands, very rare.

*September*: Madeira; Azores; 46° N. 11° W.; 48° N. 24° W., common; 56° N. 12° W.; 66° N. 18° W., rare; 41° N. 65° W.; 25°—29° N. 74° W.

*October*; Azores; 56° N. 10°—24° W.; 41° N. 59° W.

*November*: 24° S. 29° W. to 4° N. 30° W.; Cape Verde Islands to the Canaries and Cape Finisterre; Azores; 56° N. 22° W.; 48° N. 29° W.; 47°—48° N. 41° W.; 40°—42° N. 67°—64° W.; 19° N. 57° W. to 29° N. 43° W.

*December*: 26° S. 44° W. to 14° S. 36° W.; 19°—25° N. 58°—52° W.

1899 *February*: 32° N. 47° W.

*March*: 21° N. 43° W.

*June*: 15° S. 5° W.; 5° S. 17° W.; 12° N. 52° W. to 18° N. 47° W.

*July*: 12° N. 27° W.; 28°—35° N. 40° W.; 44° N. 31°—33° W.; 48° N. 23°—25° W.

*August*: 48° N. 20° W.

*November*: 51° N. 13° W., rare.

**Temperature:** 20.7, mean of 138 obs., max. 27.6 min. 7.

**Salinity:** 35.82, mean of 108 obs., max. 38.54, min. 32.84.

**Plankton-type.** This species occurs in the Mediterranean, the Red Sea and the Indian Ocean. It is common in the tropical and subtropical Atlantic, at least from 26° S. to 50° N., and rare specimens may drift towards Scotland and Iceland, even north of Iceland (September 1898). Its principal area of distribution is between Cape Verde, the Eng. Channel and New York. In July and August 1898 it was seen between 40°—50° N. across the whole Atlantic. — *S (D)*.

### TINTINNUS LUSUS UNDÆ ENTZ<sup>1</sup>.

(v. DADAY: Mitth. d. zool. Stat. zu Neapel Vol. VII, 1887, Pl. XVIII fig. 3, 14.

*T. tubulosus* Ostf. Zool. Anzeiger 1899, pag. 437. —

Scarcely distinct from *T. Fraknoi*).

1898 *March*: 45° N. 13° W.

*June*: 50° N. 12° W.

*August*: 61° N. 6° W.; 63° N. 21°—23° W.

*September*: Färöe Channel; round the Shetlands.

*October*: between Rockall and the Hebrides; Färöe Channel; Shetlands.

*November*: 45° N. 50° W. to 40° N. 69° W.

*December*: 48° N. 40° W. to 42° N. 63° W.

1899 *November*: 51° N. 28° W., rare.

**Temperature:** 11, max. 13.5, min. 5.

**Salinity:** 35.33, max. 35.46, min. 32.01.

**Plankton-type.** Noted from the Mediterranean. — *S*.

### TINTINNUS PELLUCIDUS CL<sup>2</sup>.

(Kongl. Sv. Vet. Akad. Handl. Vol. XXXII n. 3, pag. 24, Pl. I, fig. 4).

1898 *August*: 80°—81° N. 10°—23° E.

1899 *August* and *September*: W. and N. of Spitzbergen; 74° N. 18° E. to 75° N. 38° E.

**Temperature:** 2.7, mean of 7 obs., max. 4.6, min. 0.7.

**Salinity:** 33.33, mean of 7 obs., max. 34.53, min. 32.84.

**Plankton-type.** *Ng*.

<sup>1</sup> Ostenfeld's data used.

<sup>2</sup> Since the above was written I have been convinced that this species is the same as *T. bottnicus* Nordq., or *Leprotintinnus bottnicus* Jörgens., but without foreign agglutinated bodies. The genus *Leprotintinnus* is thus inadmissible.

**UNDELLA CAUDATA** (OSTF).<sup>1</sup>

(*Tintinnus caudatus* Ostf. Zool. Anzeig. Vol. XXII, 1899, pag. 437. *Undella pellucida*, JÖRGENS. Bergens Museums aarhog 1899, n. 2, Pl. I, fig. 7—8).

1897 *December*: 43° N. 18° W.

1898 *March*: 41° N. 21° W.; 45° N. 13° W.; 49° N. 33° W.

*April*: 39° N. 24° W.; 41° N. 19° W.; 49° N. 22° W.

*May*: 50° N. 14°—22° W.; 41° N. 59° W.; 42° N. 61° W.

*June*: 42° N. 50° W.

*August*: 48°—49° N. 20°—30° W.

*October*: 57°—58° N. 25°—32° W.

*November*: 0° S. 31° W.; area between 45° N. 7° W., 49° N. 32° W. and 58° N. 29° W.; 63° N. 19° W. to 62° N. 8° W.

*December*: 30° N. 16° W.; 49° N. 20°—35° W.; W. of the Färöes; 44° N. 57° W.

1899 *January*: 33° N. 15° W.; 49° N. 20° W. to 45° N. 49° W.

*April*: 46° N. 13° W.

*June*: 14°—15° S. 6°—5° W.

*October*: 56°—53° N. 31° W.

*November*: 51° N. 21° and 28° W.

**Temperature**: 14.7, mean of 38 obs., max. 26.2, min. 10.

**Salinity**: 35.48, mean of 32 obs., max. 36.68, min. 32.72.

**Plankton-type.** This species has been seen in the southern hemisphere near St. Helena and Fernando Nona. In the northern hemisphere its area of distribution is eastern, from the Canaries and Azores towards Iceland and the Färöe Channel; from there rare specimens may drift to Norway, where JÖRGENSEN has found this species at Bergen (June, August, November) — S.

**UNDELLA CLAPAREDII** (ENTZ.).

(*Tint. Clap.* Entz. Mitth. d. zool. Stat zu Neapel. Vol. VI, 1886, pag. 202 Pl. XIV, fig. 10—11).

1897 *December* and

1898 *January*: Azores to 7° N. 53° W.; 25° N. 74° W.

*February*: 13° N. 70° W. to 30° N. 74° W.

*March*: Caribbean Sea; 32° N. 74° W.; 10° N. 20° W.; Azores; 49° N. 33° W.

*April*: 10° N. 53° W.; 50° N. 9° W.; 47° N. 40° W.

*May*: 27° N. 48° W.; 48° N. 25° W. to 42° N. 45° W.

<sup>1</sup> Ostenfeld's data used.

*November*: 48°—50° N. 41°—31° N. to 36° N. 14° W.; 5° S. 33° W.

*December*: Canaries; Azores; 49° N. 27°—35° W.; Caribbean Sea.

1899 *January*: Canaries to 35° N. 9° W.; 48°—45° N. 39°—49° W.

*February*: 34° N. 40° W.

*March*: 43° N. 16° W. to 36° N. 29° W.; 18° N. 45° W.

*April*: 40°—44° N. 16°—15° W.

*June*: 20° S. 1° E. to 4° S. 19° W.; 21° N. 45° W. to 12° N. 51° W.

*July*: 11°—15° N. 26°—29° W.; 25°—28° N. 37°—40° W.

**Temperature**: 20.7<sub>9</sub>, mean of 68 obs., max. 27.3, min. 10.8.

**Salinity**: 35.9<sub>4</sub>, mean of 51 obs., max. 37.4<sub>0</sub>, min. 34.8<sub>8</sub>.

**Plankton-type**. This species occurs in the Mediterranean and in the Red Sea. It belongs to the tropical and subtropical Atlantic, from at least 20° S. to about 50° N. (November, December). — S. and D.

### UNDELLA HEROS CL.

(Öfvers. Kongl. Vetensk. Akad. Förh. 1899 n. 10, pag. 974).

1898 *February*: 30° N. 74° W.

*May*: 41° N. 51° W.

*November*: 42° N. 64° W.; 51° N. 20° W.

*December*: 34° N. 38° W.

1899 *November*: 49° N. 40° W.

**Temperature**: 17.9, mean of 5 obs., max. 21.3, min. 14.

**Salinity**: 35.8<sub>6</sub>, mean of 3 obs., max. 36.5<sub>9</sub>, min. 35.

**Plankton-type**. D. or S.

### UNDELLA HYALINA v. DADAY.

(Mitth. d. Zool. Stat. Neapel, Vol. VII, 1887, pag. 564, Pl. XVIII, fig. 17).

1898 *October*: Azores.

*November*: Azores; Canaries; 34°—36° N. 10°—14° W.

*December*: Azores.

1899 *January*: Canaries.

*March*: Azores.

**Temperature:** 18.<sub>15</sub>, mean of 13 obs., max. 21.<sub>5</sub>, min. 16.<sub>4</sub>.

**Salinity:** 36.<sub>43</sub>, mean of 7 obs., max. 36.<sub>94</sub>, min. 36.<sub>09</sub>.

**Plankton-type.** This species occurs in the area between the Canaries, the Azores and Gibraltar as well as in the Mediterranean.

— S.

### UNDELLA PARADOXA CL.

(Öfvers. Kongl. Vetensk. Akad. Förh. 1899, n. 10, pag. 974).

1898 *February*: 34° N. 73° W.

1899 *January*: 33° N. 15° W.

**Temperature:** 18.<sub>6</sub> to 20.

**Salinity:** 36.<sub>84</sub>.

**Plankton-type.** D. or S.

### UNDELLA (?) URCEOLATA (OSTF.)

(*Tintinnus urc.* Ostenf. Zool. Anzeiger, Vol. XXII, n. 601 1899, pag. 437).

1898 *March*: 45° N. 15° W.

*October*: 57° N. 27° W.

1899 *November*: 51° N. 21°—34° W., rare.

**Temperature:** 11.<sub>9</sub>.

**Salinity:** 35.<sub>19</sub>.

**Plankton-type.** S.

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## Radiolaria.

### ACANTHOCHIASMA FUSIFORME H<sub>K</sub>L.

(Mon. Pl. XIX, fig. 8).

1898 *January*: 27° N. 37° W.

*February*: 26° N. 74° W.

*March*: 23° N. 28° W.; round the Azores; area between 45° N. 36° W., 49° N. 33° W. and 49° N. 18° W.; 41° N. 56° W.; 62° N. 11° W.

*April*: 47° N. 40° W.

*May*: 38° N. 21° W.

*June*: 44° N. 9° W.

*October*: Azores; 57° N. 18° W.

*November*: 29° N. 43° W.; Azores; 52° N. 38° W.; 55° N. 14° W. to 56° N. 23° W.

*December*: Azores; 47° N. 45° W.

1899 *January*: 33° N. 37° W.; 45° N. 49° W.; 48° N. 39° W.

*February*: 34° N. 40° W.

*March*: 30° N. 35° W.; 49° N. 9° W.; 64° N. 11° W.; 66° N. 14° W.

*June*: 5° S. 17° W.

*September*: 66° N. 2° W.

*October*: 56° N. 23° W.

*November*: 51° N. 21°—28° W.

**Temperature:** 14.3, mean of 37 obs., max. 27.2, min. 6, exceptionally 0.65.

**Salinity:** 35.79, mean of 27 obs., max. 37.05, min. 33.69.

**Plankton-type.** The principal area of distribution is between the Azores, the Newfoundland Banks and the Färøe Channel, (November to March). Found in the Mediterranean and the Pacific. — S.

**ACANTHOCHIASMA KROHNII** H<sub>KL</sub>.

(Monogr. Pl. XIX, fig. 7).

1897 *December* and1898 *January*: 27°—29° N. 37°—36° W.; 44°—46° N. 17°—11° W.;  
7° N. 54° W.; 29°—35° N. 74° W.*February*: 5°—6° S. 12°—4° E.; 26° N. 74° W.*March*: 6°—4° S. 4°—10° W.; area between 23° N. 28° W.,  
the Azores, 55° N. 12° W. and 46° N. 12° W.; 12° N. 51° W.;  
40° N. 56° W.*April*: 41° N. 19° W.; 47° N. 34° W.; 7° N. 55° W.*May*: area between 38° N. 21° W., 41° N. 16° W. and 46° N.  
30° W.; 21°—23° N. 48°—45° W.*June*: 36° N. 43° W.*July*: 26° N. 48° W.; 34° N. 33° W.; 40° N. 69° W.*September*: 20°—33° N. 74° W.; 72° N. 19° E., deep sea haul  
from 250 metres.*October*: 56° N. 12° W.; 26° N. 76° W.*November*: 33° N. 10° W.; Azores; area between 50° N. 31°  
W., 56° N. 22°—30° W. and 53° N. 50° W.*December*: Azores.1899 *January*: 29° N. 16° W.*March*: 46° N. 11° W.*April*: 32° N. 75° W.*June*: 17° S. 2° W.; 18° N. 47° W.*September*: 63° N. 1° E.; 56° N. 24° W.*November*: 49° N. 40° W.**Temperature**: 18.<sub>6</sub>, mean of 54 obs., max. 28.<sub>3</sub>, min. 7.<sub>2</sub>.**Salinity**: 35.<sub>79</sub>, mean of 39 obs., max. 37.<sub>14</sub>, min. 31.<sub>84</sub>, ex-  
ceptionally 20.<sub>29</sub>.**Plankton-type.** Noted from the Mediterranean, Indian and  
Pacific. This species occurred in the Gulf of Guinea and in March  
from Cape Verde to about 55° N. Later it become rarer in this  
region, but reappeared in November at several spots between 50°  
and 56° N. It occurs, as a rule very scantily, in the Sargasso Sea,  
the Caribbean Sea and Florida current. — *S* (*D*).

**ACANTHOCORYS UMBELLIFERA** H<sub>K</sub>L.

(Monogr. Pl. VI, fig. 12).

1898 *March*: 49° N. 18° W.; 53° N. 20° W.*August*: 76°—80° N. 15°—10° E., in deep sea hauls from 400—500 m.*September*: 66° N. 18° W.; 72°—76° N. 19°—15° E., in deep-sea hauls from 230—325 m.**Temperature**: 8.3—11.**Salinity**: 35.42 to 35.65.**Plankton-type**. HÆCKEL mentions this species from the Mediterranean and the Azores. — S.**ACANTHOMETRON CATERVATUM** H<sub>K</sub>L.(Chall. pag. 745. *Acanthonia quadrifolia* (Hkl?) Auriv. *Acanthometra pallida* Clap & Lacbm. I include under the above name all *Acanthometra* with thin, needle-shaped spines of equal or nearly equal breadth and with a basal leaf-cross, either all are of the same length or four larger than the others).1898 *February*: 5° S. 9°—4° E., common.*March*: 4°—6° S. 10°—4° W.; area between the Azores, 43° N. 41° W., 53° N. 20° W. and 49° N. 18° W.; 62°—63° N. 2°—4° E.*April*: 41° N. 19° W.*May*: 46°—48° N. 31°—26° W.; 41° N. 51°—56° W.; 62° N. 2° E.*July*: 40°—41° N. 69°—65° W.; 49° N. 17° W.; 62° N. 0°—4° W.; 78° N. 1° E., haul from 500 m.*August*: 48°—49° N. 6°—20° W.; 56° N. 20°—28° W.; 60° N. 3° W.*September*: Azores; area between 56° N. 27° W., S. Iceland, 60° N. 2° E. and 56° N. 12° W.; N. of Iceland; 70° N. 21° E. to 76° N. 15° E., common on some spots.*October*: Azores; 56° N. 10°—12° and 31° W.*November*: Azores, very common; 35° N. 14° W.; area between 51° N. 20° W., 56° N. 26° W. and the Shetlands; area between 53° N. 50° W., 47° N. 41° W. and 45° N. 49° W.; 44° N. 55° W. to 40° N. 67° W.*December*: Azores; 42° N. 63° W.

1899 *June*: 25° 14' S. 7° E. -- 7° W.; 62° N. 2° E.

*July*: 45° N. 31° W.; 62° N. 0° W.

*August*: 55° N. 9° 26' W.; 60° N. 3° E.

*September*: 56° N. 12° — 24° W., as a rule rare, 67° N. 3° W. to 60° N. 3° E.

*October*: 56° N. 15° — 31° W., rare.

*November*: 51° N. 21° W., rare.

**Temperature:** 14.3, mean of 79 obs., max. 28, min. 5.1.

**Salinity:** 35.20, mean of 69 obs., max. 36.59, min. 31.81.

**Plankton-type.** Typical Styli-plankton form with essentially eastern distribution, ranging from 25° S. to Spitzbergen. — S.

### ACANTHOMETRON DOLICHOSCION H<sub>KL</sub>.

(Monogr. Pl. XVIII, fig. 3 a. b.).

1898 *June*: 23° N. 42° W.

**Temperature:** 25.

**Salinity:** 36.92.

**Plankton-type.** D.

### ACANTHOMETRON PELLUCIDUM J. MÜLL.

(*A. elasticum* Hertw. Org. d. Radiol. Pl. I, fig. 2. I include under the above name all *Acanthometra* with thin, needle-shaped spines of equal or nearly equal thickness and without a basal leaf-cross. The above name may thus comprise *Acanthometra fusca* and *A. pellucida* JOH. MÜLLER and *A. elasticum* H<sub>KL</sub>.)

1898 *January*: 17°—15° S. 38°—37° W.; 4° S. 29° W.; 7° N. 22° W.; 7°—11° N. 53°—52° W.; Caribbean Sea; 44°—46° N. 17°—11° W.

*February*: 6°—5° S. 12°—4° E.; Caribbean Sea; 26° N. 74° W.

*March*: 6°—4° S. 4°—10° W.; 1° S. 27° W. to 23° N. 17° W.; area between the Azores, 43° N. 17° W. and 47° N. 27° W.; 30° N. 35° W.; 25° N. 41° W. to 9° N. 59° W.; Caribbean Sea; 28°—32° N. 74° W.; 40° N. 64° W.

*April*: 7° N. 55° W. to 15° N. 49° W.; 27° N. 75° W.; 41° N. 58° W.; 44° N. 45° W.; 45° N. 16° W.; 41° N. 19° W.

*May*: area between 6° N. 56° W., 32° N. 37° W. and 20° N. 60° W.; 38° N. 21° W.; 41° N. 16° W.; 48° N. 33° W.; Färöes.

*June*: area between 10° N. 53' W., 19° N. 63' W., 45° N. 26° W. and the Azores; 40°—44° N. 10°—9° W.; 62° N. 2° E.

*July*: 24°—26° N. 54°—48° W.; 33°—38° N. 74° W.; 41° N. 60° W.; area between 31° N. 39° W., 42° N. 36° W. and 49° N. 22° W.

*August*: 22° N. 74° W. to 34° N. 73° W.; 41° N. 58° W. to 42° N. 48° W.; Azores; 76° N. 11° E.

*September*: 9° N. 53° W.; 20°—29° N. 74° W.; area between 30° N. 35° W., 47° N. 9° W. and 48° N. 29° W.; 20° N. 45° W.

*October*: 26° N. 76° W.; Azores; 55° N. 39° W.

*November*: 19° S. 31° W.; 4° N. 30° W.; 24° N. 21° W.; 34° N. 10° W.; 45° N. 7° W.; 60° N. 1° W.; Färöes; 29° N. 43° W.; 47° N. 41° W.; 53° N. 50° W.

*December*: 26° S. 45° W.; 19°—25° N. 58°—52° W.; Canaries; Azores; Färöes.

1899 *January*: Färöes.

*February*: 34° N. 40° W.; Färöes.

*June*: 20°—7° S. 2° E.—14° W.

*September*: 67° N. 3° W.; 56° N. 23° and 30° W.

*November*: 51° N. 13° and 21° W.

**Temperature**: 21.1, mean of 165 obs., max. 28.3, min. 4.6.

**Salinity**: 35.85, mean of 118 obs., max. 37.17, min. 32.84, exceptionally 20.29.

**Plankton-type**. Noted from the Mediterranean, Indian and Pacific. According to the above statements it occurs at least from 26° S. to 45° N., rare between that degree and 50° N. Beyond the last named limit rare specimens only were carried to the Färöes, western Norway and Spitzbergen. — *S.* and *D.*

### ACANTHONIA CUSPIDATA HKL.

(Monogr. pag. 383, Pl. XVIII, fig. 11. Under this name I include all Acanthometra with four-winged spines and basal leaf-cross.

1898 *January*: 44° N. 17° W.; 32° N. 74° W.

*February*: 5° S. 9°—4° E.; 15° N. 71° W.

- March:* 6—4° S. 42°—10° W.; 11° N. 20° W. to 23° N. 28° W.; area between the Azores, 49° N. 18° W., 43° N. 17° W. and 35° N. 28° W.; 9° N. 59° W.; 28° N. 74° W.
- April:* area between 41° N. 19° W., 50° N. 12° W. and 49° N. 22° W.; 44° N. 45° W.; 41° N. 58° W.; 42° N. 51° W.; 31° N. 75° W.
- May:* 36° N. 27° W.; 41° N. 16° W.; 50° N. 14° W.; 46° N. 38° W. to 41° N. 51° W.; area between 26° N. 42° W., 26° N. 52° W. and 20° N. 60° W.; Caribbean Sea.
- June:* 45° N. 26° W.; area between 33° N. 48° W., 40° N. 37° W. and 37° N. 26° W.; 23° N. 42° W.; 19° N. 63° W.
- July:* 34°—37° N. 33°—25° W.; 49° N. 22° W.; 45° N. 42° W.; 41° N. 58° W.; 21° N. 58° W.; 33°—38° N. 74° W.
- August:* Azores; rare at some points between 50° N. 12° W. and 44° N. 58° W.; 56° N. 20° W.; Caribbean Sea; Bahamas.
- September:* Cape Verde Islands; Azores; area between 48° N. 7° W., 46° N. 11° W., 48° N. 23° W., 56° N. 21° W. and 57° N. 14° W.; 33°—38° N. 74° W.
- October:* area between 56° N. 10°—20° W. and 57° N. 18° W.; area between the Azores, 42° N. 15° W. and 50° N. 20° W.; 21° S. 36° W.; Caribbean Sea.
- November:* 24° S. 29° W.; 4° N. 30° W. to 13° N. 27° W.; 19° N. 57° W.; 22° N. 53° W.; 32° N. 38° W.; Azores; 34° N. 10° W.; 47°—48° N. 41° W.; 56° N. 17°—23° W.
- December:* 26° S. 45° W.; Porto Rico; 25° N. 52° W.; 42° N. 17° W.; Azores; Canaries.
- 1899 *January:* 29° N. 16° W.; 34° N. 12° W.
- April:* 32°—36° N. 75°—74° W.
- May:* 33° S. 16° E.
- June:* 25° S. 7° E.; 6° S. 16° W.; 12° N. 52° W.
- September:* 56° N. 23° W.
- October:* 56° N. 23° W.; 52° N. 21° W.; 53° N. 25° W.
- November:* 51° N. 28° and 34° W.

**Temperature:** 20.<sub>1</sub>, mean of 121 obs., max. 28.<sub>2</sub>, min. 10.<sub>8</sub>.

**Salinity:** 35.<sub>82</sub>, mean of 103 obs., max. 37.<sub>10</sub>, min. 33.<sub>20</sub>.

**Plankton-type.** Noted from the Mediterranean and the Pacific.

— S. and D.

**ACANTHONIA MÜLLERI H<sub>KL</sub>.**

(Monogr. pag. 379 Pl. XV fig. 3; XVIII fig. 9.)

1898 *February*: 5° S. 9° E.*March*: Azores; 41° N. 23° W.; 49° N. 18° W.*April*: 41° N. 19° W.; 47° N. 40° W.; 50° N. 10° W.*May*: 48° N. 30° W.; 50° N. 14° W.; 61°—62° N. 1° W.—2° E.*August*: 49° N. 14° W.*September*: 56°—57° N. 21°—14° W.; 60° N. 3° W.; 72°—76° N. 19°—16° E.*October*: 56° N. 12° W.*November*: 52° N. 38° W.; 56° N. 17°—23° W.*December*: Azores; 44° N. 57° W.1899 *January*: Canaries; 48° N. 39° W.*March*: 49° N. 9° W., common.*April*: 49° N. 7° W., rare.*June*: 62° N. 1° E.*August*: 56° N. 14° W., rare.*September*: 56°—57° N. 17°—16° W., more or less rare; 56° N. 23° W., rare; 53° N. 25° W., rare.*November*: 51° N. 28° W., rare.**Temperature**: 12.9, mean of 28 obs., max. 27.3, min. 5.3.**Salinity**: 35.87, mean of 27 obs., max. 36.59, min. 32.72.**Plankton-type.** Noted from the Mediterranean. Its range of distribution is essentially eastern, from 5° S. to the north of Norway. — S.**ACANTHONIA MULTISPINA J. MÜLL.**

(Abh. 1858 Pl. VII, fig. 6—9.)

1898 *March*: 45° N. 40° W.**Temperature**: 14.**Salinity**: 35.63.**Plankton-type.** MÜLLER found this species at Messina. HÆCKEL mentions it from 3° N. 15° W. — Probaby S.

**ACANTHOSPHERA ACUFERA** H<sub>K</sub>L.

(Monogr. pag. 366 Pl. XIV fig. 1.)

1898 *March*: 40° N. 56° W.*April*: 41° N. 19° W.**Temperature**: 11° to 13.s.**Salinity**: 35.17 to 35.89.**Plankton-type.** H<sub>E</sub>CCKEL mentions this species from the Mediterranean and from 33° N. 36° W. My specimen occurred in Styli-plankton. — S.**ACANTHOSPHERA CASTANEA** H<sub>K</sub>L.

(Chall. pag. 211. Pl. XXVI fig. 3.)

1899 *January*: 45° N. 49° W., very rare.**Temperature**: 12.**Salinity**: 35.54.**Plankton-type.** H<sub>E</sub>CCKEL mentions this species from the N. Pacific — ?**ACANTHOSPHERA TENUISSIMA** H<sub>K</sub>L.

(Monogr. pag. 351 Pl. IX fig. 2.)

1898 *February*: 26° N. 74° W.*May*: Azores; 50° N. 14° W.*July*: 25° N. 74° W.; 41° N. 60° W.*November*: Azores; 47° N. 41° W.1899 *March*: Azores.**Temperature**: 19.s, mean of 8 obs., max. 27.s, min. 13.s.**Salinity**: 35.90, mean of 5 obs., max. 36.30, min. 35.37.**Plankton-type.** Noted from the Mediterranean and the Canaries. According to the above data it occurs rarely in the Styli-plankton of the eastern and western warmer Atlantic. — S.



**ACANTHOSPHERA TRICHOPHORA CL.**

(K. Sv. V. Akad. Handl. Vol. XXXIV n. 1 p. 15 Pl. V fig. 3.)

1898 *November*: 50° N. 31° W.**Temperature:** 14.**Salinity:** 35.12.**Plankton-type:** S. ?**ACROSPHERA INFLATA HKL.**

(Chall. pag. 101 Pl. V fig. 7.)

1898 *November*: 26° S. 45° W.**Temperature:** 24.2.**Salinity:** 37.41.**Plankton-type.** HECKEL mentions this species from 36° N. 50° W — D.**ACROSPHERA SPINOSA HKL.**

(Monogr. pag. 536 Pl. XXXIV fig. 12, 13.)

1898 *February*: 26°—35° N. 74°—73° W.*March*: 30° N. 35° W.*April*: 45° N. 41° W.; 50° N. 12° W.*May*: 21° N. 48° W.; 32° N. 37° W. to 38° N. 21° W.*June*: area between 24° N. 58° W., 39° N. 39° W., 42° N. 20° W., the Canaries and 23° N. 42° W.*July*: 39°—36° N. 23°—28° W.; 33° N. 74° W.*August*: Azores.*September*: 20° N. 45° W.; 26° N. 39° W.; 35° N. 30° W.*October*: 21° S. 36° W.; Azores.*November*: 24° N. 29° W.; Cape Verde Islands; 22°—29° N. 53°—43° W.; 50° N. 12° W.*December*: 41° N. 66° W.1899 *February*: 32° N. 47° W.*July*: 40° N. 38° W.**Temperature:** 21.15, mean of 41 obs., max. 27.1, min. 12.**Salinity:** 36.11, mean of 32 obs., max. 37.34, min. 34.60.

**Plankton-type.** Noted from the Mediterranean and the Canaries. From the above data it appears that this species occurs in the whole tropical Atlantic, at least from 21° S. to 40° N., beyond which limit rare specimens may be conveyed to the SW of Ireland (50° N.) — *D.*

### ACTINOMMA ORCADOPHORUM HKL.<sup>2</sup>

(Chall. pag. 255 Pl. XXIX fig. 7, 8.)

1898 *December*: 25° N. 52° W.

**Temperature**: 24.2.

**Salinity**: 37.17.

**Plankton-type.** Noted from the central Pacific — *D.*

### ACTINOMMA BOREALE CL.

(Kongl. Sv. Vet. Akad. Handl. Vol. XXXII, 3, pag. 16 Pl. I fig. 5.)

1898 *March*: 62° N. 2° E.

*July*: 78° N. 3° W., deep sea haul.

*August*: 77°—80° N. 12°—10° E., deep sea haul.

*September*: 72°—76° N. 19°—15° E., deep sea haul.

*November*: 56° N. 36° W., surface.

1899 *January*: 48° N. 39° W., surface.

*September*: 67° N. 3° E., deep sea haul.

**Temperature** (surface): 7.8 to 11.

**Salinity** (surface): 35.00 to 35.58.

**Plankton-type.** ?

### ACTINOMMA SOL CL.<sup>1</sup>

(K. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 p. 5 Pl. V fig. 2.)

1899 *January*: 45° N. 49° W.

**Temperature**: 12.

**Salinity**: 35.54.

**Plankton-type**: S. ?

<sup>1</sup> Since the above was written, I found this form to be the same as *Cromyomma villosum* HKL.

**AMPHIHYMENIUM ELEGANS** CL.

(K. Sv. Vet. Akad. Vol. XXXIV n. 1 pag. 6 Pl. V fig. 1.)

1898 *December*: 25° N. 52° W.

**Temperature**: 24.5.

**Salinity**: 37.17.

**Plankton-type**. D.

**AMPHILONCHE BELONOIDES** HKL.

(Monogr. pag. 392 Pl. XVI fig. 6; XVIII fig. 21 — *A. concreta* HKL.  
Chall. pag. 787 Pl. CXXXII fig. 4.)

1897 *December* and

1898 *January*: 43°—46° N. 18°—11° W.; 7° N. 22° W.; 18° N. 46° W. to 7° N. 53° W.; 25°—32° N. 74° W.

*February*: 5° S. 4° E.; Caribbean Sea, 21° N. 74° W.

*March*: 7° N. 21° W.; 23° N. 28° W.; 25° N. 16° W.; 36° N. 29° W. to 41° N. 23° W.; 12° N. 51° W. to 9° N. 59° W.; Caribbean Sea; 32° N. 74° W.

*April*: 41° N. 19° W.; 45° N. 41° W.

*May*: area between the Azores, 46° N. 31° W., 43° N. 43° W. and 26° N. 42° W.

*June*: Azores; 28°—30° N. 52° W.

*July*: Azores; 41° N. 60° W. to 42° N. 48° W.

*August*: Azores; 41° N. 65° W. to 44° N. 42° W.

*September*: 43° N. 48° W.; 46° N. 39° W.

*October*: 57° N. 18° W.

*November*: 18°—19° S. 31° W.; area between 40° N. 67° W.; 56° N. 36° W. and 51° N. 20° W.

*December*: 29° S. 49° W.; 43° N. 61° W. to 44° N. 57° W.; 49° N. 35° W.

1899 *January*: Canaries.

*February*: 32° N. 47° W.

*March*: 35°—36° N. 16°—29° W.

*April*: 28° N. 75° W.

*June*: 20° S. 1° E.; 18° S. 1° W.; 27° N. 39° W.

*September*: 56° N. 30° W.

*October*: 53° N. 31° W.

*November*: 49°—52° N. 40°—48° W.

**Temperature:** 19.5, mean of 88 obs., max. 28, min. 8.

**Salinity:** 35.19, mean of 58 obs., max. 38.08, min. 32.18.

**Plankton-type.** This species belongs to the tropical Atlantic and occurred in March S. of 40° N. In May it advanced in the central Atlantic beyond 45° N. In July to December (maximum in November) it occurred from the E. of New York, between 40° and 55°, towards the Irminger Sea. Rare specimens were in October drifted nearly to Rockall. It is found in the Mediterranean and the Pacific. — *D.*

### AMPHILONCHE DIODON HKL.

(Chall. pag. 783 Pl. CXXXII fig. 3.)

1898 *January:* 44° N. 17° W.

*March:* 9° N. 59° W.; 12° N. 51° W.

*April:* 7° N. 55° W.

*May:* 11° N. 52° W.

*June:* 19° N. 63° W.

*September:* 25°—29° N. 74° W.

*October:* 16° N. 70° W.

*November:* 17° N. 25° W.

*December:* 18° N. 67° W.

1899 *April:* 28°—36° N. 75°—74° W.

*June:* 12° N. 52° W.

**Temperature:** 24.7, mean of 15 obs., max. 28.2, min. 14.2.

**Salinity:** 35.91, mean of 12 obs., max. 36.42, min. 34.88.

**Plankton-type.** The principal area of distribution is off the north coast of S. America, the Caribbean Sea and Florida Current to 36° N. It is rarer on the east, where it occurs in the winter. HECKEL mentions it from 11° N. 18° W. (April) — *D.*

### AMPHILONCHE ELONGATA (MÜLL.).

(HKL. Monogr. pag. 392 Pl. XVIII fig. 22.)

1897 *December:* 12° N. 50° W. to 43° N. 18° W.

1898 *January:* 17° S. 38° W.; 7°—18° N. 53°—46° W.; Caribbean Sea; 29°—35° N. 74° W.; 7° N. 22° W.; 44° N. 17° W.

*February:* Caribbean Sea; 26°—34° N. 74°—73° W.

- March*: 6° S. 4° W. to 1° S. 15° W.; Cape Verde Islands; 26° N. 29° W.; 41° N. 23° W. to 9° N. 53—59° W.; Caribbean Sea; 28° N. 74° W.; 41° N. 56° W.; 45° N. 40° W.; 49° N. 18° W.
- April*: 10° N. 43° W.; 25° N. 41° W.; 27° N. 75° W.; 47° N. 40° W.
- May*: 23° N. 45° and 56° W.; 20° N. 60° W.
- June*: 45° N. 26° W.
- July*: Azores.
- August*: Azores; 40° N. 66° W.
- September*: Cape Verde Islands; Azores.
- October*: Azores; 54° N. 45° W.
- November*: 26—19° S. 30—31° W.; Cape Verde Islands; 34° N. 10° W.; Azores; 42° N. 64° W.
- December*: 26° S. 45° W.; Canaries; Azores; 18° N. 67° W.
- 1899 *March*: 35° N. 16° W.
- April*: 28—32° N. 74° W.
- May*: 35° N. 74° W.
- June*: 20° S. 2° E. to 6° S. 16° W.; 15° N. 50° W.
- July*: 45—48° N. 31°—25° W.
- September*: 56° N. 31° W.

**Temperature**: 21.6, mean of 78 obs., max. 28, min. 11.

**Salinity**: 35.79 mean of 38 obs., max., 37.41, min. 34.71.

**Temperature**: This species occurs, according to HÆCKEL, in the Mediterranean, the Indian and Pacific Oceans. It occurs, according to the above data over the whole tropical Atlantic to about 40° N., sparingly beyond this degree nearly to 50° N. — *D.*

#### AMPHILONCHE OVATA (MÜLL.).

(Abh. d. Berl. Akad. 1858 pag. 47 Pl. VII fig. 10; IX fig. 4 — The above name may include *A. conica* HkL. or comprises such forms as have relatively little different, not winged or angular, spines with a basal leaf-cross. They seem to me to be very nearly akin to *Acanthometron siculum*, which differs in having spines of equal length.)

1898 *January*: 12—11° N. 50—52° W.

*February*: 13° N. 17° W.

*March*: 6° S. 4° W.; 12° N. 50° W. to 9° N. 59° W.; Caribbean Sea; 35° N. 28° W.

*April:* 25° N. 42° W.; 7° N. 55° W.; 23° N. 72° W. to 34° N. 74° W.

*May:* area between 20° N. 60° W., 30° N. 42°—36° W. and 21° N. 48° W.

*June:* off Madeira; 10° N. 53° W.; area between 22° N. 60° W., 37° N. 41° W., 29° N. 36° W. and 23° N. 42° W.

*July:* Azores; 29° N. 44° W. to 21° N. 58° W.; Caribbean Sea; 23°—33° N. 74° W.; 41° N. 58° W.; 44° N. 39° W.

*August:* Caribbean Sea; 22°—25° N. 74° W.; 40° N. 66° W. to 45° N. 43° W.

*September:* Caribbean Sea; 25°—33° N. 74° W.; 20° N. 45° W.; 30° N. 34° W. to the Azores; 45° N. 14° W.

*October:* 26° N. 76° W.; 42° N. 15° W.

*November:* 0° N. 31° W. to 20° N. 23° W.; 22° N. 53° W.; 26° N. 48° W.; 34° N. 33° W.; 35° N. 14° W.; 51° N. 20° W.

*December:* 26° N. 45° W.; 14° N. 36° W.; 19° N. 58° W.; 25° N. 52° W.

1899 *January:* 32° N. 16° W.

*March:* 21° N. 43° W.

*May:* 25° S. 7° E.

*June:* 20° S. 1° E. to 3° S. 20° W.; 21° N. 45° W.

*July:* 11° N. 26° W.

*November:* 51° N. 34° W.

**Temperature:** 24.2, mean of 97 obs., max. 28.3, min. 14.

**Salinity:** 36.17, mean of 84 obs., max. 37.48, min. 33.88.

**Plankton-type.** Occurs in the Mediterranean and Pacific (HKL) and according to the above data over the whole tropical Atlantic, to about 40° N., in July to September, rarely later, between 40° and 50° N. *D.*

### AMPHILONCHE TENUIS HKL.

(Monogr. pag. 389 Pl. XVI fig. 1, XVIII fig. 16.)

1898 *March:* 10° N. 54° W.; 9° N. 59° W.

*April:* 7° N. 55° W.

*May:* 29° N. 39° W.; 38° N. 21° W.; 41° N. 51° W.

*June:* 19° N. 63° W.

*July:* 26° N. 48° W.; 15° N. 71° W.

*August*: 44° N. 42° W.

*October*: Azores.

1899 *April*: 32° N. 75° W.

**Temperature**: 23.7, mean of 12 obs. max. 28, min. 17.2.

**Salinity**: 36.10, mean of 10 obs., max. 37.01, min. 35.58.

**Plankton-type.** HÆCKEL mentions this species from the Mediterranean, the Canaries and the Azores. According to the above data this species occurs principally north of S. America, in the Caribbean Sea, rarer in the eastern Atlantic. — *D.*

### AMPHILONCHE TETRAPTERA H<sub>KL</sub>.<sup>1</sup>

(Monogr. pag. 391 Pl. XVI fig. 5; XVIII fig. 20.)

1897 *December* and

1898 *January*: 17° S. 38° W.; 4° S. 29° W.; 7° N. 22° W.; 7° N. 53° W. to 32° N. 33° W.; 45° N. 13° W.; 32° N. 74° W.

*February*: Caribbean Sea and Florida current to 34° N. 73° W.

*March*: area between 6° S. 4° W., 39° N. 25° W. and 9° N. 59° W.; 28° N. 74° W.; 45° N. 13° W.

*April*: 7° N. 55° W. to 15° N. 49° W.; 31° N. 75° W.

*May*: area between 20° N. 60° W., 26° N. 52° W., 32° N. 36° W. and 23° N. 45° W.; Caribbean Sea; 31° N. 75° W.; 41° N. 59—54° W.; 50° N. 14° W.; Azores.

*June*: area between 19° N. 63° W., 23° N. 42° W. and 33° N. 48° W.; Azores; Madeira.

*July*: from the Azores to the Caribbean Sea; 40—41° N. 69—60° W.

*August*: Caribbean Sea; 40° N. 66° W. to 44° N. 42° W.; 48° N. 24° W.; Azores.

*September*: 12° N. 27° W.; 30° N. 35° W.; 17° N. 48° W.; Caribbean Sea; 25—38° N. 74° W.; 42° N. 57° W.; area between the Azores, 46° N. 39° W., and 56° N. 21°—12° W.; 66° N. 18° W.

<sup>1</sup> Under this name I include all forms of *Amphilonche* which have four-winged large spines, not having in most cases examined, whether the spines have a basal leaf-cross or not; thus the above name may comprise also *A. heteracantha* H<sub>KL</sub> and perhaps *Amphibetone anomala* H<sub>KL</sub>.

*October*: 26° N. 76° W.; 56° N. 29° 40' W.; Azores.

*November*: 0° S. 31° W. to 20° N. 23° W.; 19° N. 58° W. to 26° N. 48° W.; 40° N. 67° W.; 55° N. 14° W.; 45° N. 7° W.;

Azores: 36° N. 14° W.

*December*: some points between Porto Rico and the Azores.

1899 *January*: 33° N. 15° W.; 35° N. 9° W.

*March*: Azores.

*April*: 46° N. 9° W.; 28°—36° N. 75°—74° W.

*June*: St Helena to 3° S. 20° W.; 15° N. 49° W.

*September*: 56° N. 26° W.

**Temperature**: 22.24, mean of 155 obs., max. 28.4, min. 7.

**Salinity**: 35.89, mean of 101 obs., max. 37.43, min. 31.84.

**Plankton-type.** According to HECKEL *A. tetraptera* occurs in the Mediterranean, off Sierra Leone, at the Canaries and the Azores, *A. heteracantha* in the Mediterranean and the Pacific. It appears from the above statements that the four-winged *Amphilonche*-forms occur in the Desmo-plankton of the Atlantic to about 40° N. From May to September (maximum in August) they advanced beyond that degree, and rare specimens were carried in September to November towards the Engl. Channel and Rockall, in November to January to the Bay of Biscay, Gibraltar and the Canaries. — *D.*

### ANTHOCYRTIDIUM CINERARIA HKL.

(Chall. pag. 1278 Pl. LXII fig. 16.)

1898 *December*: 25° N. 52° W.

**Temperature**: 24.2.

**Salinity**: 37.17

**Plankton-type.** Noted from the central Pacific. — *D.*

### ANTHOCYRTIUM ANTHEMIS HKL.

(Chall. pag. 1237. Cl. K. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. III f. 12)

1898 *March*: 63° N. 2° E.

**Temperature**: 6.7.

**Salinity**: 35.10.

**Plankton-type.** Noted from the north Pacific, 35° N. 170° E.-abysmal. — I found one specimen only in a very poor sample containing Tricho-plankton. — ?



**ARACHNOCORYS POLYPTERA** H<sub>KL</sub>.

(Chall. pag. 1267.)

1898 *February*: 21° N. 74° W.

**Temperature**: 25.1.

**Plankton-type**. Noted from the S. Pacific. — *D*.

**ARCHICIRCUS PRIMORALIDIS** H<sub>KL</sub>.

(Chall. pag. 942 Pl. LXXXI fig. 1.)

1898 *December*: 18° N. 67° W.

**Temperature**: 26.s.

**Salinity**: 34.88.

**Plankton-type**. Noted from the central Pacific (abysmal).  
*D*? *S*?

**ASTROLONCHE SERRATA** H<sub>KL</sub>.

(*Niphacantha serrata* H<sub>KL</sub>. Mongr. Pl. XVIII fig. 3; XVIII fig. 14.)

1898 *March*: 39° N. 29° W.

**Temperature**: 15.5.

**Salinity**: 35.95.

**Plankton-type**. Occurs in the Mediterranean, Atlantic and Pacific. — My specimens were found in Styli-plankton. — *S*.

**AULACANTHA LÆVISSIMA** H<sub>KL</sub>.

(Cl. Kongl. Sv. Vet. Akad. Handl. Vol. XXXII n. 3 pag. 27 Pl. I fig. 7.)

1898 *August*: 78° N. 3° W. (deep sea haul).

**Plankton-type**. Found in the Färöe Channel. — *S*. ?

**AULACANTHA SCOLYMANTHA** H<sub>KL</sub>.

(Monogr. pag. 263 Pl. II fig. 1, 2; IV fig. 1-5.)

1898 *November*: 49° N. 12° W.; 50° N. 31° W.

*December*: 43° N. 57° W.

1899 *April*: 41° N. 17° W.  
*October*: 52° N. 21° W.

**Temperature:** 13.8, mean of 4 obs., max. 14.8, min. 13.

**Salinity:** 35.10, mean of 3 obs., max. 35.85, min. 34.04.

**Plankton-type.** According to HÆCKEL the most common of all *Aulacanthida*, occurring outside the Atlantic in the Mediterranean, Indian and Pacific Oceans. It is remarkable that I have found it so rarely, always in Styli-plankton. — S.

### AUODENDRON ANTARCTICUM HÆKL.

(Chall. pag. 1589 Pl. CV fig. 5.)

1898 *July*: 78° N. 3° W. (deep sea haul).

**Plankton-type.** Noted from Kerguelen. — ?

### AUOSCENA SPECTABILIS HÆKL.

(Chall. pag. 1628 Pl. CX fig. 8, 9.)

1898 *July*: 78° N. 3° W. (deep sea haul).

1899 *June*: 67° N. 3° W. (deep sea haul).

**Plankton-type.** Noted from the Antarctic Ocean. — ?

### AUOSPHERA CRUCIATA HÆKL.

(Chall. pag. 1624 Pl. CX fig. 10.)

1899 *January*: 45° N. 49° W.

**Temperature:** 12.

**Salinity:** 35.54.

**Plankton-type.** Noted from the Mediterranean, the Canaries and the Caribbean Sea. — S? D?

### BELONZOUM ATLANTICUM HÆKL.

(Chall. pag. 40.)

1898 *October* and *November*: Azores.

**Temperature:** 19.7 to 20.

**Plankton-type.** HÆCKEL mentions this species from 3° N. 15° W (April). — Probably S.

**BEROETTA MELO CL.**

(Kongl. Sv. Vet. Akad. Handl. Vol. XXXII n. 3 pag. 27 Pl. 1 fig. 8.)

1898 *July*: 78° N. 3° W. (deep sea haul).**Plankton-type**: ?.**BOTRYOPYLE SETOSA CL.**

(K. Sv. Vet. Akad. Handl. Vol. XXXII n. 3 pag. 27 Pl. 1 fig. 10.)

1898 *August and September*: 76°—78° N. 15° E.—3° W. (deep sea hauls from 325 m. and more).1899 *January*: 45° N. 49° W. (temperature 12, salinity 35.54)*July*: 71°—72° N. 21°—22° W. (hauls from 180 m. and more).**Plankton-type**. ?**CALLIMITRA EMMÆ HKL.**

(Chall pag. 1218 Pl. LXIII fig. 3, 4.)

1897 *December* and1898 *January*: 12° N. 50° W.; 32° N. 74° W.*February*: Caribbean Sea; 21°—30° N. 74° W.*March*: Caribbean Sea; 15° N. 49° W.; 18° N. 46° W.*May*: 23° N. 56° W.*September*: 33° N. 74° W.*November*: 22° N. 53° W.*December*: 14° S. 36° W.; 18° N. 67° W.**Temperature**: 26.8, mean of 12 obs., max. 26.8, min. 19.5.**Salinity**: 36.42, mean of 5 obs., max. 36.98, min. 34.88.**Plankton-type**. Found in the abysmal central Pacific. According to the above data this species occurs east of tropical America. — *D*.**CERIASPIS FAVOSA HKL.**

(Chall. pag. 821 Pl. CXXXVIII fig. 6.)

1898 *March*: 4° S. 10° W.*December*: 18° N. 67° W.

1899 *April*: 36° N. 74° W.

**Temperature:** 22.1 to 26.8.

**Salinity:** 34.88 to 36.21.

**Plankton-type:** D?

### CHALLENGERIA HARSTONII J. MURRAY.

(Chall. Report. Narrative I pag. 226 A. fig. 14 a.)

1898 *July*: 78° N. 3° W. (deep sea haul).

*August*: 80° N. 10° E. (deep sea haul).

*September*: 76° N. 15° E.

**Plankton-type.** Noted from the east of Japan, abyssal.

### CHALLENGERIA TRIDENS HKL.

(Moebius Fünfte Ber. d. Kieler Comm. Pl. VIII fig. 43—44.)

1898 *July*: 78° N. 3° W. (deep sea haul).

*August*: 63° N. 15° W.; 78° N. 12° E.; 80° N. 10° E. (deep sea haul).

*September*: 65° N. 36° W.; 76° N. 13° E.; 72°—76° N. 19°—15° E. (deep sea hauls).

*October*: 64° N. 21° W.

*November*: 63° N. 16° W.; 56° N. 30° and 36° W.

1899 *November*: 52° N. 48° W.

**Temperature:** 7.6, mean of 6 obs., max. 10.8 min. 6.

**Salinity:** 35.07, mean of 6 obs., max. 35.31, min. 34.59.

**Plankton-type.** Noted from the Färöe Channel. The area of distribution is, according to the above statements, essentially northern, from 52° to 80° N. The mean salinity is higher than for Tricho-plankton. — ?

### CHALLENGERIA XIPHODON HKL.

(Moebius: Fünfte Ber. d. Kieler Commiss., 1887, Pl. VIII fig. 41—42.)

1897 *December* and

1898 *January*: Cape Verde Islands; Canaries; 34° N. 30° W. to 41° N. 22° W.

*March*: Cape Verde Islands;  $32^{\circ}$  N.  $32^{\circ}$  W.

*April*:  $41^{\circ}$  N.  $19^{\circ}$  W.

*July*:  $62^{\circ}$  N.  $0^{\circ}$  W.

*September*:  $66^{\circ}$  N.  $18^{\circ}$  W.

*November*:  $34^{\circ}$  N.  $10^{\circ}$  W.; many points in the area between  $53^{\circ}$  N.  $50^{\circ}$  W.,  $47^{\circ}$  N.  $40^{\circ}$  W.,  $56^{\circ}$  N.  $23^{\circ}$  W. and  $55^{\circ}$  N.  $14^{\circ}$  W.

*December*: Azores;  $42^{\circ}$  N.  $16^{\circ}$  W.

1899 *January*:  $45^{\circ}$  N.  $49^{\circ}$  W.

*February*:  $32^{\circ}$  N.  $47^{\circ}$  W.;  $34^{\circ}$  N.  $40^{\circ}$  W.

*March*:  $36^{\circ}$ — $37^{\circ}$  N.  $29^{\circ}$ — $26^{\circ}$  W.

*November*:  $51^{\circ}$  N.  $28^{\circ}$  W.;  $49^{\circ}$  N.  $40^{\circ}$  W.

**Temperature**:  $14.19$ , mean of 29 obs., max.  $19.8$ , min.  $7$ .

**Salinity**:  $35.61$ , mean of 20 obs., max.  $36.49$ , min.  $33.78$ .

**Plankton-type**. The distribution is eastern, from Cape Verde to N. Iceland. — S.

#### CHALLENGERON BREVISPIA CL.

(K. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. III fig. 14, 15.)

1898 *March*:  $63^{\circ}$  N.  $2^{\circ}$  E.

**Temperature**:  $6.7$ .

**Salinity**:  $35.10$ .

**Plankton-type**: *T*. ?

#### CHALLENGERON CHANNERI J. MURRAY.

(Chall. Report. Narrative I pag. 226 Pl. A. fig. 12.)

1899 *January*:  $48^{\circ}$  N.  $42^{\circ}$  W., very rare.

**Temperature**:  $12$ .

**Salinity**:  $35.54$ .

**Plankton-type**. Noted from the E. of Japan (abysmal).

**CHALLENGERON NATHORSTII A.**

(Kongl. Sv. Vet. Akad. Handl. Vol. XXXII n. 3 pag. 28 Pl. I fig. 9.)

1898 *August and September*: 80°—72° N. 10°—19° E. deep sea hauls from 230 m. and more).

*November*: 56° N. 30° W.

1899 *March*: 64° N. 12° W.

**Temperature**: 6.8 to 9.6.

**Salinity**: 35.08 to 35.39.

**Plankton-type**: ?

**CHOENICOSPHERA MURRAYANA H<sub>K</sub>L.**

(Chall. pag. 102 Pl. VIII fig. 4.)

1898 *November*: 29° N. 19° W.; 56° N. 17° W.

1899 *November*: 51° N. 21° W.

**Temperature**: 11.6 to 21.5

**Salinity**: 35.27 to 36.97.

**Plankton-type**. Noted from the Färöe Channel. — S.

**CLATHROCYCLAS COSCINODISCUS H<sub>K</sub>L.**

(Chall. pag. 1389 Pl. LVIII fig. 3, 4.)

1898 *November*: 53°—56° N. 50°—36° W.

**Temperature**: 7.2 to 7.8.

**Salinity**: 34.59 to 35.00.

**Plankton-type**. Found in the central Pacific, abysmal. My specimens occurred in Styli- and Tricho-plankton intermingled.

**CLATHROCYCLAS DANAES H<sub>K</sub>L.**

(Chall. pag. 1388 Pl. LIX fig. 13, 14.)

1898 *November*: 56° N. 30° W.

**Temperature**: 9.6.

**Salinity**: 35.08.

**Plankton-type**. Noted from the Canaries. My specimens occurred in Styli-plankton.

**CENOSPHÆRA INERMIS** H<sub>K</sub>L.

(Heliosph. in, Monogr pag. 351 Pl. IX fig. 1.)

1898 *January*: 11° N. 52° W.*September*: 33° N. 74° W.**Temperature**: 25 to 26.<sub>4</sub>.**Salinity**: 36.<sub>25</sub>.**Plankton-type**. Found in the Mediterranean, Indian and Pacific. — *D.* ?**CLADOCOCCUS ARBORESCENS** MÜLL.

(Abh. d. Berl. Akad. 1858 pag. 31 Pl. I fig. 2.)

1898 *March*. Cape Verde Islands.**Temperature**: 23.**Salinity**: 35.<sub>78</sub>.**Plankton-type**. Noted from the Canaries and the Mediterranean. — My specimen was found in Styli-plankton.**CLADOCOCCUS BIFURCUS** H<sub>K</sub>L.

Monogr. pag. 368 Pl. XIII fig. 7, 8.)

1898 *March*: 43° N. 17° W.; 49° N. 18° W.**Temperature**: 11 to 12.<sub>8</sub>.**Salinity**: 35.<sub>65</sub> to 35.<sub>76</sub>.**Plankton-type**. Noted from the Mediterranean, the Canaries and the Azores. — *S.*, with eastern distribution.**CLADOCOCCUS VIMINALIS** H<sub>K</sub>L.

(Monogr. pag. 369 Pl. XIV fig. 2, 3.)

1898 *April*: 47° N. 32° W.*May*: 26° N. 42° W.**Temperature**: 15 to 23.<sub>1</sub>.**Salinity**: 35.<sub>70</sub> to 37.<sub>16</sub>.**Plankton-type**. Found in the Mediterranean. — *S. D.* ?

**CLATHROCANIUM MINUTUM CL.**

(K. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. IV fig. 9.)

1898 *October*: 21° S. 36° W.

**Temperature**: 22.

**Salinity**: 37.<sub>21</sub>.

**Plankton-type**. *D*.

**COELODASEA SPONGIOSA H<sub>K</sub>L.**

(Chall. pag. 1739.)

1898 *March*: 49° N. 18° W.

**Temperature**: 11.

**Salinity**: 35.<sub>65</sub>.

**Plankton-type**. Noted from the equatorial Atlantic, abysmal.  
— My specimen was found in Styli- and Tricho-plankton intermingled.

**COELODENDRUM RAMOSISSIMUM H<sub>K</sub>L.**

(Monogr. pag. 363 Pl. XIII fig. 1-3.)

1898 *January*: 47° N. 11° W.

*March*: 41° N. 60° W.

*April*: 41° N. 19° W.; 48° N. 8° W.; 50° N. 12° W.

*November*: 50° N. 31° W.

*December*: 47° N. 45° W.

**Temperature**: 12.<sub>2</sub>, mean of 7 obs., max. 14, min. 6.

**Salinity**: 35.<sub>55</sub>, mean of 5 obs., max. 35.<sub>84</sub>, min. 35.<sub>31</sub>.

**Plankton-type**. Occurs in the Mediterranean, Indian and Pacific. According to the above data it belongs to Styliplankton with eastern distribution. — *S*.

**COLLOSPHÆRA HUXLEYI J. M<sub>I</sub>LL.**

(H<sub>K</sub>L. Monogr. pag. 534 Pl. XXXIV fig. 1, 2 — *C. globularis* and *C. tuberosa* included.)

1898 *January*: 36° N. 27° W.; 32° N. 74° W.

*February*: 21° N. 74° W. to 34° N. 73° W.



*March:* 14° N. 50° W.; Cape Verde Islands; 26° N. 39° W.; 30° N. 35° W.; Azores.

*May:* 23° N. 45°—56° W.; 26° N. 42° W.

*June:* area between 16° N. 48° W., 27° N. 55° W. and 40° N. 37° W.

*July:* 26° N. 48° W.; 33° N. 74° W.; 40° N. 67° W.

*August:* 40° N. 67° W. to 50° N. 10° W.

*September:* 26° N. 39° W.; 41° N. 65° W.; 48°—50° N. 29°—11° W.

*October:* 21° S. 36° W.

*November:* 26° S. 30° W. to 5° S. 33° W.; 50° N. 21° W.

*December:* 22°—25° N. 56°—52° W.; Caribbean Sea; 41° N. 66° W.

1899 *February:* 32°—34° N. 47°—40° W.

*May:* 50° N. 33° W.

*June:* Azores.

**Temperature:** 22.3, mean of 47 obs., max. 28, min. 14.

**Salinity:** 35.96, mean of 43 obs., max. 37.31, min. 32.92.

**Plankton-type.** Tropical Atlantic to 40° N., between 40°—50° N. from New York to the Engl. Channel in July—September (max. Aug.) — *D*.

### COLLOZOOM INERME (J. MÜLL.)

HKL. Monogr. pag. 522 Pl. XXXV — *C. ellipsoides* HKL. included.)

1898 *January:* 33° N. 31° W.

*March:* Azores; 48° N. 6° W.

*April:* 45° N. 16° W.; 48° N. 8° W.; 50° N. 12° W.

*May:* 41° N. 51° W.

*June:* Azores; 71°—72° N. 21°—23° E.

*July:* Azores; 72° N. 3° W. (AURIV.)

*August:* 60° N. 4° W.

*September:* Cape Verde Islands; Azores; Madeira; 56° N. 12° W.; 60° N. 2°—11° W.

*October:* 21° S. 36° W.; Azores; 42° N. 15° W.

*November:* Azores.

*December:* Azores.

1899 *February*: 32° N. 47° W.

*April*: 46°—48° N. 13°—9° W.

*May*: 50°—51° N. 33°—26° W.

*June*: 65°—67° N. 1°—3° W.

*July*: 62° N. 0° W.; 71° N. 21° W.

*September*: 56° N. 24° W.; 61° N. 1° E.; 68° N. 8° W.

**Temperature**: 16.7, mean of 33 obs., max. 25.8, min. 6.1.

**Salinity**: 35.74, mean of 24 obs., max. 37.21, min. 34.88.

**Plankton-type**. According to HÆCKEL, cosmopolitan. It appears from the above data that it belongs to the Styli-plankton of the eastern Atlantic. — S.

### COROCALYPTRA ELISABETHÆ HKL.

(Chall. Pl. LIX fig. 10.)

1898 *February*: 21° N. 74° W.

*November*: 56° N. 23° W.

**Temperature**: 25.1. and 10.8.

**Salinity**: 35.32.

**Plankton-type**. Noted from the tropical Atlantic, 0° S. 14° W. — D.

### CROMYOMMA ZONASTER (EHB.)

(*Acanthosphaera zon.* EHB. Abh. d. Berl. Akad. 1872 pag. 285 Pl. II fig. 2.)

1898 *September*: 73° N. 19° E. (deep sea haul).

**Plankton-type**. Noted from Greenland — ?

### CYPHONIUM CERATOSPYRIS HKL.

(Monogr. pag. 445 Pl. XXII pag. 14—16.)

1898 *February*: 16° N. 71° W.

**Temperature**: 20.7.

**Plankton-type**. Noted from the Canaries and the Mediterranean — S. ? D. ?

CYPHONIUM PROFUNDUM H<sub>KL</sub>.

(*Ommatospyris prof.* EHB. Abh. d. Berl. Akad. 1872 Pl. VIII fig. 5; X fig. 5.)<sup>1</sup>

- 1898 *January*: 7° N. 22° W.; 7° N. 53° W.; 32° N. 74° W.  
*March*: 6° S. 4° W.; 9° N. 53°—59° W.; 12°—14° N. 51°—59° W.  
*May*: 23° N. 56° W.; 29° N. 39° W.; 28° N. 47° W.; 41° N. 59° W.  
*June*: 22° N. 60° W. to 30° N. 52° W.  
*July*: 21° N. 58° W.; 26° N. 48° W.; 29°—33° N. 74° W.  
*August*: 25° N. 74° W.  
*September*: 23° N. 42° W.; 33° N. 31° W.; 33° N. 74° W.  
*October*: 21° S. 36° W.; 26° N. 76° W.  
*November*: 4° N. 30° W.; 36° N. 14° W.; 19° N. 58° W.  
*December*: 25° N. 52° W.

**Temperature**: 25.0, mean of 32 obs., max. 28, min. 17.5.

**Salinity**: 36.38, mean of 25 obs., max. 37.51, min. 34.18.

**Plankton-type**: *D*.

CYRTOCALPIS AMPHORA H<sub>KL</sub>.

(Monogr. pag. 286 Pl. V fig. 2, *C. obliqua* and *C. oculum*, which I do not consider as distinct species, included.)

- 1898 *February*: 26°—34° N. 74°—73° W.  
*May*: 41° N. 51° W.  
*July*: 31° N. 39° W.  
*November*: 26° N. 48° W.  
*December*: 18° N. 67° W.  
 1899 *February*: 32° N. 47° W.

**Temperature**: 23.3, mean of 6 obs., max. 26.8, min. 19.8.

**Salinity**: 36.39, max. 37.13, min. 34.88.

**Plankton-type**. Found in the Mediterranean, Atlantic and Pacific. — *D*.

<sup>1</sup> Seems to me to be nothing but the interior shells of *Panartus*, *Peripanartus* etc.

**DICTYOCEPHALUS CYLINDRICUS CL.**

(K. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. IV fig. 10.

1898 *Februari*: 15° N. 71° W.**Temperature**: 27.**Plankton-type**. — *D*.**DICTYOCERAS NEGLECTUM CL.**

(K. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. IV fig. 5.)

1898 *January*: 11° N. 52° W.; 15° N. 70° W.*March*: 32° N. 32° W.; 12°—17° N. 51°—47° W.*May*: 26° N. 42° W.; 29° N. 39° W.*June*: 30°—31° N. 52°—50° W.*September*: 9° N. 53° W.; 33° N. 74° W.*October*: 15° N. 70° W.; 26° N. 76° W.*November*: 19° N. 58° W.*December*: 19°—22° N. 58°—56° W.**Temperature**: 25.1° mean of 16 obs., max. 28.2, min. 18.2.**Salinity**: 36.01, mean of 14 obs., max., 37.16, min. 34.05.**Plankton-type**: *D*.**DICTYOCHA STAPEDIA HKL.<sup>1</sup>**

(Chall. pag. 1561 Pl. CI fig. 11—12.

1898 *January*: 32° N. 74° W.*February*: 34° N. 74° W.*March*: 7°—12° N. 55°—50° W.; 41° N. 21°—23° W. to 44° N. 17° W.*April*: 49° N. 22° W.*July*: 60° N. 23° W.*September*: 49° N. 3° W.; 56°—57° N. 28°—44° W.; 60° N. 3°—4° W.*October*: 56° N. 29° W. to 62° N. 7° W. and 60° N. 3° W.*November*: 40° N. 68° W.; 45° N. 50° W.; 56° N. 36° and 23° W.; 59° N. 2° W.

<sup>1</sup> Ostenfeld's data for *D. fibula* used. Questionable whether a radiolaria or a silicoflagellate.

*December*: 45° N. 50° W.

1899 *January*: 45° N. 49° W.

*February*: 32° N. 47° W.

*April*: 44° N. 15° W.; 48° N. 9° W.

*July*: 57° N. 31° W.

**Temperature**: 14.6, mean of 26 obs., max. 26, min. 7.8.

**Salinity**: 35.01, mean of 19 obs., max. 36.49, min. 32.20.

**Plankton-type**: Found in the Indian and Pacific Oceans. S. ?

### DICTYOPHIMUS GRACILIPES BAIL.

(CLEVE Kongl. Sv. Vet. Akad. Handl. Vol. XXXII n. 3 pag. 29 Pl. II fig. 2.)

1898 *August* (July—September): 76° N. 15° E. to 80° N. 10° E. and  
78° N. 3° W (deep sea hauls from 325 m. and more.)

*November*: 56° N. 23° — 36° W.

1899 *January*: 45° — 48° N. 49° — 39° W.

*July*: 71° N. 21° W. (deep sea haul from 225 m.)

*September*: 67° N. 3° W (deep sea haul from 500 m.)

*November*: 51° N. 21° W.

**Temperature**: 10.2, mean of 5 obs., max. 12, min. 7.3 (surface).

**Salinity**: 35.29, mean of 5 obs., max. 35.58, min. 35.00.

**Plankton type**. Noted from the north Pacific and Kamtschatka. — ?

### DIPLOCONUS FASCES HKL.

(Monogr. pag. 405 Pl. XX fig. 7, 8.)

1898 *January*: 7° N. 53° W. to 14° N. 49° W.; 32° N. 74° W.

*February*: 5° S. 9° E.; 26° — 30° N. 74° W.

*March*: 4° S. 10° W.; Canaries; 30° — 32° N. 35° — 32° W.;  
9° N. 59° W.; 28° N. 74° W.

*April*: 10° N. 53° W. to 15° N. 49° W.

*May*: 28° N. 47° W. to 29° N. 39° W.

• • *July*: 19° N. 63° W. to 21° N. 58° W.; 29° N. 44° W. to 34°  
N. 33° W.

*August*: 34° N. 73° W.

*September*: 12° N. 27° W.; Madeira; Azores; 33° N. 74° W.

*October*: Azores; 34° N. 74° W.

*November*: 4° N. 30° W.; 22° N. 53° W. to 29° N. 43° W.; Azores.

*December*: 29° S. 49° W.; 18° N. 67° W.; 36° N. 6° W.

1898 *January*: 35° N. 9° W.

*March*: 30° N. 35° W.

*April*: 32° N. 75° W.

*May*: 25° S. 7° E.

*June*: 14° S. 6° W. to 4° S. 18° W.; 21° N. 45° W.

*July*: 11°—12° N. 26°—27° W.

**Temperature**: 23.<sub>2</sub>, mean of 53 obs., max. 28, min. 16.

**Salinity**: 36.<sub>29</sub>, mean of 38 obs., max. 37.<sub>43</sub>, min. 33.<sub>93</sub>.

**Plankton-type**. Found in the Mediterranean. — *D*.

#### DIPLOSPHÆRA DICTYOTA HKL.

(Chall. pag. 247.)

1898 *December*: Azores.

**Plankton-type**. Noted from the Canaries. — *S*. ?

#### DORATASPIS.

Specimens of *Dorataspis* have been found in many samples from the tropical Atlantic, but as I am not convinced of the correctness of the determinations, I prefer to leave out all my notes about this genus.

#### ELAPHOCOCCUS CERVICORNIS HKL.

(Monogr. pag. 370 Pl. XIV fig. 4—6.)

1898 *February*: 30° N. 74° W.

*November*: Azores

**Temperature**: 18.<sub>3</sub> to 20.<sub>4</sub>.

**Plankton-type**. According to HÆCKEL cosmopolitan, Mediterranean, Indian, Pacific. My specimens were found in Desmo- and Styli-plankton intermingled.

**EUCHITONIA ECHINATA** H<sub>K</sub>L.

(Chall. pag. 536 Pl. XLIII fig. 11.)

1898 *January*: 7° N. 53° W.; 7° N. 22° W*December*: 18° N. 67° W**Temperature**: 26.4 to 28.**Salinity**: 34.88.**Plankton-type**. HÆCKEL mentions this species from 38° N. 146° W., abysmal.**EUCHITONIA ELEGANS** (E<sub>H</sub>B.)(Pteractis eleg. E<sub>H</sub>B. Abh. d. Berl. Akad. 1872 Pl. VIII fig. 3.)1897 *December*: 12° N. 50° W.1898 *November*: 19° N. 58° W**Temperature**: 26.5 to 27.5.**Salinity**: 35.22.**Plankton-type**. Found in the Philippine Sea. — *D*.**EUCHITONIA MÜLLERI** H<sub>K</sub>L.

(Monogr. pag. 508 Pl. XXX fig. 5—10.)

1898 *January*: 7°—12° N. 53°—50° W.*March*: 49° N. 16° W.; 41° N. 23° W.*May*: 41° N. 51°—54° W*September*: 9° N. 53° W.*October*: 26° N. 76° W.*November*: 19° N. 58° W.*December*: 18°—19° N. 67°—58° W.; 34° N. 38° W.; 49° N. 30° W.1899 *March*: 47° N. 8° W.**Temperature**: 20.5, mean of 14 obs., max. 28, min 11.**Salinity**: 35.48, mean of 12 obs., max. 36.59, min. 34.05.**Plankton-type**. Occurs »in all Seas» H<sub>K</sub>L. — *D*.

**EUCHITONIA TRIANGULUM (EHB.)**

(Stylactis EHB. Abh. d. Berl. Akad. 1872. Pl. VIII fig. 9.)

1898 *October*: 21° S. 36° W.1899 *January*: 45° N. 49° W.*June*: 14° S. 6° W.**Temperature**: 19, mean of 3 obs., max. 23, min. 12.**Salinity**: 36.48 N., mean of 3 obs., max. 37.21, min. 35.51.**Plankton-type**. Noted from the Pacific and the Azores. — *D.* ?**EUCHITONIA YPSILOIDES HKL.**

(Chall. pag. 536.)

1898 *December*: 18° N. 67° W.**Temperature**: 26.8.**Salinity**: 34.88.**Plankton-type**. Noted from the Mediterranean and the Canaries. — My specimen was found in Styli- and Desmo-plankton intermingled.**EUCYRTIDIUM CIENKOWSKII HKL.**

(Chall. pag. 1493 Pl. LXXX fig. 9.)

1898 *February*: 16° N. 71° W.*March*: 8°—9° N. 59° W.*December*: 19° N. 58° W.**Temperature**: 26.8, max. 27, min. 26.**Salinity**: 35.30 to 35.58.**Plankton-type**. Found in the South Pacific, abysmal. — *D.***EUCYRTIDIUM SCALARINUM HKL.**

(Chall. pag. 1494.)

1897 *December*: 12° N. 50° W.; 32° N. 33° W.1898 *February*: 26° N. 74° W.*September*: 9° N. 53° W.; 15° N. 71° W.*December*: 18° N. 67° W.



**Temperature:** 24.9, mean of 6 obs., max. 28, min. 19.6.

**Salinity:** 34.63, mean of 3 obs., max 34.96, min. 34.04.

**Plankton-type:** Found in the N. Atlantic, 36° N. 50° W.

### EUCYRTIDIUM TROPEZIANUM (J. MÜLL.)

(*Lithocampe trop.* MÜLL, Abh. d. Berl. Akad. 1858 pag. 42. Pl. VI fig. 4—6.)

1897 *December* and

1898 *January:* 7° N. 53° W.; 25°—32° N. 74° W.; 43° N. 17° W.;  
32° N. 33° W.; 29° N. 36° W.

*March:* 32° N. 32° W.; 41° N. 23° W.; 45° N. 13° W.

*May:* 26° N. 52° W.; 41° N. 59° W.; 32° N. 36° W.

*June:* 22° N. 60° W.; 25° N. 57° W.

*July:* 21° N. 58° W.; 24° N. 54° W.; 26° N. 48° W.; 31° N.  
39° W.

*August:* 22°—25° N. 74° W.

*September:* 15° N. 71° W.; 20° N. 74° W.

*October:* 21° S. 36° W.; Azores.

*November:* 19° N. 58° W.; 22° N. 53° W.; 29° N. 43° W.

*December:* 18° N. 67° W.; 19° N. 58° W.; 25° N. 52° W.;  
41° N. 66° W.

**Temperature:** 23.5, mean of 31 obs., max. 28.1, min. 11.9.

**Salinity:** 36.13, mean of 24 obs., max. 37.17, min. 34.43.

**Plankton-type.** Noted from the Mediterranean. — *D.*

### EUCORONIS CHALLENGERI HKL.

(Chall. pag. 978 Pl. LXXXII fig. 4.)

1898 *January:* 7° N. 53° W.

*February:* 16° N. 71° W.

*July:* 21° N. 58° W.

*September:* 15° N. 70° W.

*December:* 41° N. 66° W.

**Temperature:** 23, mean of 5 obs., max. 28.4, min. 12.

**Salinity:** 34.60 and 34.96 (doubtless anomalous).

**Plankton-type.** Occurs in the Pacific and Indian Oceans. —  
My specimens are all from the western tropical Atlantic. — *D.*

**EUCORONIS NEPHROSPYRIS** H<sub>KL</sub>.

(Chall. pag. 977 Pl. LXXXII fig. 5.)

1898 *November*: 19° N. 58° W.*December*: 18° N. 67° W.**Temperature**: 26.8.**Salinity**: 34.88 to 35.22.**Plankton-type.** Occurs in the Mediterranean and Indian Ocean. — *D.***EUPHYSETTA LUCANI** BORGERT.

(Ergebn. d. Plankton Expedition A. Pl. VI fig. 8.)

1899 *January*: 45° N. 49° W., very rare**Temperature**: 12.**Salinity**: 35.54.**Plankton-type.** The sample in which this species was found. contained chiefly Tricho-plankton and some Styli-plankton.**EUPHYSETTA NATHORSTII** CL.

(Kongl. Sv. Vet. Akad. Handl. Vol. XXXII n. 3 pag. 29 Pl. II fig. 3.)

1898 *July*: 78° N. 3° W. (deep sea haul).**Plankton-type**: ?**EUPHYSETTA PUSILLA** CL.

(K. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. III fig. 16.)

1899 *January*: 45° N. 49° W.**Temperature**: 12.**Salinity**: 35.54.**Plankton-type** ?

**EUSCENIUM TRICOLPIUM** H<sub>KL</sub>.

(Chall. pag. 1147 Pl. LIII fig. 12.)

1898 *March*: 62° N. 2° E.*July*: 78° N. 3° W. (deep sea haul from 2,600 m.).*November*: 53° N. 32° and 50° W.; 56° N. 36°, 30° and 23° W*December*: 43° N. 57° W.1899 *March*: 64° N. 12° W.*November*: 51° N. 21° W**Temperature**: 9.1, mean of 5 obs., max. 13, min. 6.8.**Salinity**: 34.92, mean of 5 obs., max. 35.39, min. 34.04.

**Plankton-type.** According to H<sub>ECKEL</sub> this species has been found in the central Pacific, abysmal; according to the above data it occurs in the Northern Atlantic in most cases associated with Styli-plankton, but it seems nevertheless not to be a true Styli-plankton-form. To judge from its non occurrence in the Atlantic, S. of 40°, it seems as if it derived from the Polar Basin or N. Pacific, as is probably the case also with many other radiolaria of the Northern Atlantic.

**GAZELLETTA HEXANEMA** H<sub>KL</sub>.

(Chall. pag. 1671 Pl. CXX fig. 5.)

1898 *March*: 49° N. 18° W.**Temperature**: 11°**Salinity**: 35.65.

**Plankton-type.** Found in the Atlantic, Mediterranean, Indian and Pacific. My specimens were found in Styli- and Tricho-plankton intermingled. — S. ?

**HALIOMMA ECHINOSPHERA** CL.

(K. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. V fig. 5.)

1899 *January*: 45° N. 49° W.**Temperature**: 12.**Salinity**: 35.52.**Plankton-type**: ?

**HALIOMMA IRREGULARE** CL.

K. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. fig. 4)

1899 *January*: 45° N. 49° W.**Temperature**: 12.**Salinity**: 35.51.**Plankton-type**. ?**HALIOMMA SPINULOSUM** J. MÜLL.

(Abh. der Berl. Akademie 1858 pag. 39 Pl. IV fig. 6.)

1897 *December*: 12° N. 50° W.1898 *February*: 13°—16° N. 70°—71° W.; 21° N. 74° W.*March*: 40° N. 56° W.; 30° N. 35° W.*June*: 10° N. 53° W.*July*: 15° N. 71° W.; 41° N. 58° W.*August*: 41° N. 57° W.*September*: 9° N. 53° W.; 15° N. 71° W.; Azores; 56° N. 21° W.*October*: 16° N. 70° W.*November*: 8°—13° N. 28°—27° W.; Azores.*December*: 18° N. 67° W.; 41° N. 66° W. to 44° N. 57° W.1899 *November*: 51° N. 13° W.**Temperature**: 22.3, mean of 22 obs., max. 28.2, min. 10.**Salinity**: 34.96, mean of 16 obs., max. 36.25, min. 32.99.**Plankton-type**. Noted from the Mediterranean and the central Pacific. — D. ?**HELIOSPHERA ACTINOTA** HKL.

Monogr. pag. 352 Pl. IX, fig. 3).

1898 *March*: 17° N. 47° W.*May*: 21° N. 48° W.*July*: 78° N. 3° W. (deep sea haul).*October*: 26° N. 76° W.*December*: 30° N. 16° W.1899 *January*: 29° N. 16° W.**Temperature**. 22.4, max. 26.1, min 16.8.**Salinity**: 36.19, max. 36.73, min 36.13.

**Plankton-type.** Noted from the Mediterranean, the Atlantic, and the Canaries. — *D.*

### HELIOSPHERA MINUTA CL.

(K. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. VI fig. 2.)

1898 *March*: 41° N. 21°—23° W.; 49° N. 18° W.; 62° N. 11° W.  
*August*: 17° N. 71° W.

**Temperature:** 11.7, mean of 4 obs., max. 14.9, min. 8, exceptionally 27.2.

**Salinity:** 35.63, mean of 3 obs., max. 35.87, min. 35.37.

**Plankton-type:** *S.* ?

### HEXACONTIUM ARMATUM CL.

(K. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. VI fig. 5.)

1898 *November*: 56° N. 17° W.

**Temperature:** 11.6.

**Salinity:** 35.27.

**Plankton-type:** *S.*

### HEXACONTIUM ASTERACANTHION HKL.

(Monogr. pag. 441 Pl. XXIII fig. 5—6. The fig. 22 Pl. VI in VANHÖFFEN'S D. Fauna u. Flora Grönlands, which has erroneously been named *Hevalanche hevalantha*, probably represents this species.)

1898 *March*. 62° N. 2° E.

1899 *November*: 51° N. 21° and 28° W.

**Temperature:** 7.4 (one obs.).

**Salinity:** 35.12 (one obs.).

**Plankton-type.** Found in the Atlantic, Mediterranean and Pacific. My specimens were found in Styli-plankton. — *S.* ?

**HEXACONTIUM HOSTILE** CL.

(K. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. VI fig. 4.)

1898 *November*: 56° N. 23° W.**Temperature**: 10.8.**Salinity**: 35.32.**Plankton-type**: S. ?**HEXACONTIUM SETOSUM** HKT.

(Chall. pag. 198.)

1899 *January*: 45° N. 49° W.**Temperature**: 12.**Salinity**: 35.54.**Plankton-type**. Found in the Mediterranean, the Atlantic and the Pacific. — *D.* ?**HEXADORAS BOREALIS** CL.(CL. K. Sv. Vet. Akad. Handl. Vol. XXXII n. 3 pag. 30 Pl. II fig. 4. — *Rhizoplegma* sp. AURIV. l. c. Vol. XXXII n. 6. pag. 28.)1898 *March*: 63° N. 2° E.*July*: 77° N. 12° E. (deep sea haul).*August*: 80° N. 10° E. (deep sea haul).*September*: 72° N. 19° E. (deep sea haul).**Plankton-type**. ?**HEXALASPIS HELIODISCUS** HKL.

(Chall. pag. 875 Pl. CXXXIX fig. 2.)

1898 *January*: 11° N. 52° W.*May*: 29° N. 39° W.; 26° N. 52° W.*June*: 24° N. 58° W.; 31° N. 17° W.; 34° N. 33° W.; 37° N. 33° W.*July*: 21° N. 58° W.; 26° N. 48° W.

*October:* 39° N. 21° W.

*November:* 24° S. 29° W.; 22° N. 53° W.; 26° N. 48° W.;  
36° N. 14° W.

*December:* 18° N. 67° W.; 25° N. 52° W.; 28° N. 17° W.

1899 *May:* 25° S. 7° E.

*June:* 14° S. 6° W.; 5° S. 17° W.

**Temperature:** 22.8, mean of 19 obs., max. 27.5, min. 14.5.

**Salinity:** 36.45, mean of 16 obs., max. 37.48, min. 34.88.

**Plankton-type.** Found in the central Pacific. — *D.*

### HEXALONCHE AMPHISIPHON H<sub>KL</sub>.

(Chall. pag. 182 Pl. XXV fig. 2.)

1898 *June:* 22° N. 60° W.; 23° N. 42° W.

*September:* 17° N. 48° W.

*November:* 19° S. 31° W.

**Temperature:** 25.9, mean of 4 obs., max. 27.2, min. 25.

**Salinity:** 36.88; mean of 4 obs., max. 37.26, min. 36.38.

**Plankton-type.** Found in the central Pacific. — *D.*

### HEXALONCHE HEXACANTHA (J. MÜLLER).

(*Urtiomma her.* MÜLLER Abh. d. Berl. Akad. 1858 pag. 35. Pl. IV fig. 5.)

1898 *January:* 46° N. 11° W.

*March:* 49° N. 18° W.

*November:* 56° N. 23° W.

**Temperature:** 11.5, mean of 3 obs., max. 12.8, min. 10.8.

**Salinity:** 35.32 to 35.65.

**Plankton-type.** Found in the Mediterranean. — *S.*

### HEXALONCHE OCTAHEDRA H<sub>KL</sub>.

(Chall. pag. 181 Pl. XXII fig.)

1898 *November:* 56° N. 30° and 17° W.

*December:* 18° N. 67° W.

1899 *October:* 56° N. 15° W.

**Temperature:** 26.8; 11.6; 9.6.

**Salinity:** 34.88; 35.03; 35.27.

**Plankton-type.** Found in the central Pacific, abyssal. —  
S. ? D. ?

### HEXALONCHE PHILOSOPHICA H<sub>K</sub>L.

(Chall. pag. 186 Pl. XXII fig. 4.)

1898 *March*: 46° N. 11° W.; 63° N. 2° E.

*November*: 55° N. 14° W.; 56° N. 17° and 30° W.

1899 *March*: 64° N. 11° W.

**Temperature:** 9.1, mean of 5 obs., max. 11.6, min. 6.7.

**Salinity:** 35.23, mean of 5 obs., max. 35.42, min. 35.03.

**Plankton-type.** Noted from the Färöe Channel and from  
Iceland. — S.

### HEXASTYLUS NOBILIS CL.

(K. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. VI fig. 1)

1898 *November*: 49° N. 60° W.

**Temperature:** 27.5.

**Salinity:** 35.22.

**Plankton-type:** D. ?

### HEXASTYLUS PHÆNAXONIUS H<sub>K</sub>L.

(Chall. pag. 171 Pl. XXI fig. 3.)

1898 *November*: 49° N. 57° W.

**Temperature:** 27.5.

**Salinity:** 35.22.

**Plankton-type.** Found in the central Pacific, abyssal. — D.



**HYMENIASTRUM EUCLIDIS** H<sub>KL</sub>.

(Chall. pag. 531 Pl. XLIII fig. 13.)

1898 *January*: 7° N. 53° W.; 12° N. 51° W.*March*: 4° N. 10° W.; 9° N. 59° W.*July*: 21° N. 58° W.; 41° N. 58° W.*August*: 41° N. 57° W.; Azores.*September*: 21° S. 36° W.; 9° N. 53° W.*November*: 19° N. 58° W.; 22° N. 53° W.*December*: 18° N. 67° W.; 34° N. 38° W.1899 *April*: 36° N. 74° W.*June*: 14° S. 6°—7° W.; 3° N. 20° W.**Temperature**: 24.9, mean of 16 obs., max. 28, min 13.4.**Salinity**: 35.75, mean of 14 obs., max. 37.21, min. 34.05.**Plankton-type**. Found in the central Pacific. — *D*.**HYMENIASTRUM LEYDIGII** H<sub>KL</sub>.

(Monogr. Pl. XXXI fig. 4, 5. — Small specimen, central disc 0.03 mm.; arms 0.05 m. m. Patagium with 2 rows of cellulæ.)

1899 *January*: 45° N. 49° W.**Temperature**: 12.**Salinity**: 35.51.**Plankton-type**. Found in the Pacific, the Atlantic and the Mediterranean.**HYSTRICHASPIS DORSATA** H<sub>KL</sub>.

(Chall. pag. 823, Pl. CXXVIII fig. 10.)

1898 *November*: 37° N. 27° W.**Temperature**: 20.**Salinity**: 36.21,**Plankton-type**. Found in the central Pacific. — *D*. ? *S*. ?

**HYSTRICHASPIS PECTINATA** H<sub>KL</sub>.

(Chall. pag. 822 Pl. CXXXVIII fig. 8.)

1898 *March*: 4° S. 10° W.; 3° N. 16° W.*October*: Azores.*December*: 18° N. 67° W.1899 *February*: 32° N. 47° W.*June*: 5° S. 17° W.**Temperature**: 24.8, mean of 6 obs., max. 28, min. 19.8.**Salinity**: 35.51, mean of 6 obs., max. 36.49, min. 34.8.**Plankton-type**. Noted from the region of Sierra Leone. — D.**ICOSASPIS ELEGANS** H<sub>KL</sub>.

(Chall. pag. 844 Pl. CXXXVI fig. 4.)

1898 *February*: 5° S. 4° E.*April*: 14° N. 70° W.*May*: 32° N. 37° W.**Temperature**: 21.1 to 28.**Salinity**: 34.12 to 36.38.**Plankton-type**. Found from Ascencion to the Canaries. — S.?**ICOSASPIS TABULATA** H<sub>KL</sub>.

(Chall. pag. 843 Pl. CXXXVI fig. 2.).

1898 *October*: 56° N. 10° W.**Temperature**: 12.**Salinity**: 35.16.**Plankton-type**. Found in the north Pacific, between Japan and San Francisco, abysmal. — S.?**ICOSASPIS TETRAGONOPA** H<sub>KL</sub>.(*Halimmatidium* Monogr. Pl. XXII fig. 13.)1898 *March*: 23° N. 28° W.**Temperature**: 20.**Salinity**: 36.91.**Plankton-type**. Found in the Mediterranean. — S.?

**LAMPROCYCLAS ÆGLES (EHB.)**

(*Podocyrtilis Ægles* EHB. Microg. Pl. XXXV B. B. IV fig. 18.)

1898 *March*: 62° N. 2° E.

**Temperature**: 7.4.

**Salinity**: 35.12.

**Plankton-type**. Found in the bottom-mud of the northern Atlantic. — *S.* ?

**LAMPROMITRA CORONATA H<sub>KL</sub>.**

(Chall. pag. 1214 Pl. LX fig. 7.)

1898 *January*: 32° N. 74° W.

**Temperature**: 19.5.

**Plankton-type**. Found in the central Pacific, abysmal.

**LAMPROMITRA EROSA CL.**

(K. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. IV fig. 2, 3.)

1899 *January*: 45° N. 49° W

**Temperature**: 12.

**Salinity**: 35.54.

**Plankton-type**: ?

**LITHARACHNIUM (TENTORIUM H<sub>KL</sub>.) SP.**

(The determination is not trustworthy, and my specimens may belong, at least in part, to *L. arachnodicus* or *L. epeira*, if these really be distinct species. I have published my notes, because the distribution of these forms seems to be of interest, especially as one specimen was found W. of Norway.)

1898 *March*: 32° N. 74° W; 62° N. 2° E.

*April*: 48° N 29° W.

**Temperature**: 7.4 to 13.8.

**Salinity**: 35.12 to 35.75.

**Plankton-type**. *Litharachnium tentorium* occurs in the Mediterranean, *L. epeira* has been found in the central Pacific and *L.*

*arachnodiscus* in bottom-mud from Greenland. The specimen found at 62° N. 2° E. occurred together with a number of other radiolaria, which seem to derive from the northern Pacific.

### LITHELIUS ARBORESCENS HKL.

(Chall. pag. 695.)

1898 *November*: 40° N. 67° W.

**Temperature:** 18.2.

**Plankton-type.** Noted from the Färöe Channel. My specimen occurred in Styli- and Tricho-plankton intermingled.

### LITHOLOPHUS LIGURINUS HKL.

(Chall. pag. 736 — *L. arcticus* AURIV. and *L. decimialis* HKL. included.)

1898 *July*: 36° N. 28° W.; 61° N. 4° W.; 78° N. 7° E.; 78° 1° E—3° W (deep sea hauls AURIV.).

*August*: 56° N. 13° W.; 76—77° N. 11° E.; 79° N. 10° E. (deep sea haul AURIV.).

*September*: 12° N. 27° W.; Azores; 56° N. 27° W.; 60° N. 3° W.; 71° 74° N. 19° E.

*October*: 21° S. 36° W.; 56° N. 10° W.; Westmannaö.

*November*: 4° N. 30° W.; 34° N. 33° W.; 34—36° N. 10°—14° W.; 52° N. 38° W.; 53° N. 32° W.; 56° N. 23° W.

*December*: 26° S. 45° W.; Azores.

1899 *January*: 29° N. 16° W.

*February*: 32° N. 47° W.

*April*: 32° N. 75° W.; 37° N. 26° W.; 44° N. 15° W.

*May*: 50° N. 33—39° W.; 62° N. 8° W.

*June*: 4°—7° S. 19—14° W.; 62° N. 1° E. to 65° N. 1° W.

*July*: 71° N. 21° W. to 74° N. 20° W.

*August*: 55—56° N. 26—23° W.

*September*: 65° N. 2° W.

*October*: 56° N. 23° W.; 53° N. 31°—37° W.

*November*: 51° N. 13° and 21° W.

**Temperature:** 16.2, mean of 31 obs., max. 27.2, min. 5.31.

**Salinity:** 35.69, mean of 26 obs., max. 37.11, min. 34.21.

**Plankton-type.** *L. ligurinus* is found the Mediterranean and central Pacific, *L. decimalis* also in the Atlantic and Indian Ocean, *L. arcticus* from Davis's Strait. If they, as I believe, represent one species only, this species belongs principally to the east Atlantic and spreads thence to the northern and arctic Atlantic, being one of the most eurythermous forms of the *Styli-plankton*.

### LITHOLOPHUS RHIPIDIUM H<sub>KL</sub>.<sup>1</sup>

(Monogr. pag. 402 Pl. XIX fig. 6. — *L. decapristis* H<sub>KL</sub>. included.)

1898 *September*: 15° N. 71° W.; 29° N. 74° W.

*October*: Azores.

*November*: 4° N. 30° W.; 45° N. 7° W.

*December*: Canary Islands; Azores.

1899 *March*: 36° N. 29° W.

*April*: 48° N. 9° W.

*June*: 6° S. 16° W.; 4° S. 19° W.

**Temperature**: 21.5, mean of 12 obs., max. 28.1, min. 12.1.

**Salinity**: 35.88, mean of 10 obs., max. 36.76, min. 34.96.

**Plankton-type.** Found in the region W. of Sierra Leone and in the Mediterranean. — *S. D.*

### LITHOMELISSA THORACITES H<sub>KL</sub>.<sup>2</sup>

(Monogr. pag. 301 Pl. VI fig. 2—8.)

1898 *January*: 7° N. 53° W.

*February*: 16° N. 71° W. to 30° N. 74° W.

*May*: 41° N. 51° W.

*September*: 9° N. 53° W.

*November*: 56° N. 23° W.

*December*: 18° N. 67° W.

1899 *January*: 45° N. 19° W.

**Temperature**: 20.1, mean of 9 obs., max. 28, min. 10.8.

<sup>1</sup> All observations before September 1898 excluded as not trustworthy.

<sup>2</sup> *Lithomelissa thoracites* AL RIV. (Kongl. Sv. Vet. Akad. Handl. Vol. XXXII n. 6 pag. 28) from the Arctic Sea is another species, or *Peridium* ? *minutulum* CL.

**Salinity:** 35.16, mean of 5 obs., max. 36.01, min. 34.05.

**Plankton-type.** Found in the Atlantic, Mediterranean, Indian, Pacific. — *S.* ? *D.* ?

### LITHOMITRA LINEATA EHB.

(Cl. Kongl. Sv. Vet. Akad. Handl. Vol. XXXII n. 3 pag. 30 Pl. II fig. 7.)

1898 *July*: 78° N. 3° W. (deep sea haul).

*August*: 80° N. 10° E. (deep sea haul).

*September*: 72° N. 19° E. (deep sea haul).

**Plankton-type.** Found in the Atlantic, Mediterranean, Indian and Pacific. — ?

### LITHOPERA BACCA EHB.

(Abh. d. Berl. Akad. 1872 Pl. VIII fig. 1.)

1898 *June*: 23° N. 42° W.; 33° N. 48° W.

— *August*: 22° N. 74° W.

*October*: 21° S. 36° W.

**Temperature:** 24.7, mean of 4 obs., max. 27.8, min. 22.

**Salinity:** 36.68, mean of 4 obs., max. 37.21, min. 36.25.

**Plankton-type.** Found in the tropical, central Pacific. — *D.*

### LITHOPHYLLIUM FOLIOSUM J. MÜLL.

(Abh. d. Berl. Akad. 1858 pag. 52 Pl. XI fig. 6—10.)

1898 *June*: 34° N. 33° W.

*July*: 49° N. 22° W.

*December*: 29° S. 49° W.

**Temperature:** 21.0, mean of 4 obs., max. 23.8, min. 19.

**Salinity:** 35.48, mean of 4 obs., max. 36.80, min. 34.58.

**Plankton-type.** Found in the Mediterranean. — *S.* ?

**LITHOPHYLLIUM GLADIATUM** H<sub>K</sub>L.

(Chall. pag. 754 Pl. CXXX fig. 3.

1898 *May*: 26° N. 42° W.*September*: 33°—35° N. 31°—30° W**Temperature**: 23.<sub>1</sub> to 25.<sub>8</sub>.**Salinity**: 36.<sub>33</sub> to 37.<sub>16</sub>.**Plankton-type**. Found in the north Pacific. — *D*.**LITHOPTERA DARWINII** H<sub>K</sub>L.

(Chall. Rep. Narrative pag. 222 fig. 90.)

1898 *December*: 25° N. 52° W.**Temperature**: 24.<sub>2</sub>.**Salinity**: 37.<sub>17</sub>.**Plankton-type**. Noted from the region west of Patagonia. — *D***LITHOPTERA MÜLLERI** H<sub>K</sub>L.

(Monogr. pag. 398 Pl. XX fig. 1, 2.)

1898 *October*: Azores.1899 *April*: 32° N. 75° W.**Temperature**: 21.<sub>1</sub> to 21.<sub>8</sub>.**Salinity**: 36.<sub>23</sub> to 36.<sub>28</sub>.**Plankton type**. Found in the Mediterranean. — *S*. ?**LITHOPTERA TETRAPTERA** H<sub>K</sub>L.

(Chall. pag. 779 Pl. CXXXI fig. 9.)

1898 *October*: Azores.*November*: Azores; 32° N. 38° W.*December*: Azores.**Temperature**: 19.<sub>7</sub>, mean of 5 obs., max. 22, min. 18.<sub>3</sub>.**Salinity**: 36.<sub>21</sub> to 36.<sub>69</sub>.**Plankton-type**. Noted from the region between Sierra Leone and Ascension. — *S*. ?

**LITHOSTROBUS BOTRYOCYRTIS** H<sub>KL</sub>.

(Chall. pag. 1475 Pl. LXXIX fig. 18, 19.)

1897 *December*: 12° N. 50° W.1898 *February*: 16° N. 71° W.*March*: 9° N. 59° W.; 16° N. 70° W.; 45° N. 13° W.*September*: 9° N. 53° W.*October*: 21° S. 36° W.*November*: 22° N. 53° W.; 50° N. 31° W.; 55° N. 44° W;  
56° N. 30° and 23° W.1899 *January*: 45° N. 49° W.**Temperature**: 18.<sub>3</sub>, mean of 13 obs., max. 28, min. 6.**Salinity**: 35.<sub>51</sub>, mean of 9 obs., max. 37.<sub>21</sub>, min. 34.<sub>72</sub>.**Plankton-type**. Found in the central Pacific, abyssal. — *D*.**LYCHNASPIS GILTSCHII** H<sub>KL</sub>.

(Chall. pag. 839 Pl. XCV fig. 3.)

1898 *February*: 26° N. 74° W.*March*: 4° S. 10° W.; 23° N. 28° W.; 9° N. 59° W.*May*: 23° N. 56° W.; 28° N. 47° W.; 29° N. 39° W.; 30° N.  
42° W.; 32° N. 37° W.*June*: 19° N. 63° W.; 27° N. 55° W.*July*: 21° N. 58° W.; 26° N. 48° W.; 41° N. 58° W.*September*: 9° N. 53° W.; 15° N. 71° W.*October*: 26° N. 76° W.*November*: 8° N. 28° W.; 22° N. 53° W.; 36° N. 14° W.;  
Azores.**Temperature**: 24.<sub>7</sub>, mean of 21 obs., max. 28.<sub>1</sub>, min. 17.<sub>5</sub>.**Salinity**: 36.<sub>08</sub>, mean of 19 obs., max. 37.<sub>04</sub>, min. 33.<sub>88</sub>.**Plankton-type**. Noted from 21° S. 14° W. to 3° N. 15° W.  
— *D*.**LYCHNASPIS UNDULATA** H<sub>KL</sub>.

(Chall. pag. 841 Pl. CXXXV fig. 2.)

1898 *December*: Azores.**Temperature**: 18.<sub>8</sub>.**Plankton-type**. Noted from Ascension. — *S*. ? *D*. ?



**PANARTUS DIPLOCONUS** H<sub>KL</sub>.

(Chall. pag. 379 Pl. XL fig. 1.)

1898 *October*: 21° S. 36° W.**Temperature**: 22.**Salinity**: 37.21.**Plankton-type**. Found in the central Pacific, abyssal. My specimen was found in Styli- and Desmo-plankton intermingled.**PANARTUS SPINOSUS** H<sub>KL</sub>.

(Chall. pag. 381.)

1898 *December*: 16° N. 67° W.**Temperature**: 26.8.**Salinity**: 34.88.**Plankton-type**. Found in the north Pacific. — *D.* ? *S.* ?**PANARTUS TETRATHALAMUS** H<sub>KL</sub>.

(Chall. 378 Pl. XL fig. 3.)

1898 *March*: 12° N. 51° W.*November*: 19° N. 58° W.**Temperature**: 25.3 to 27.5.**Salinity**: 35.22.**Plankton-type**. Found in the Atlantic, Mediterranean and Pacific. My specimens were found in Desmo-plankton. — *D.***PANICIUM CORONATUM** H<sub>KL</sub>.

(Chall. pag. 386 Pl. XL fig. 4.)

1898 *November*: 19° N. 58° W.**Temperature**: 27.5.**Salinity**: 35.72.**Plankton-type**. Found in the central Pacific, abyssal. — *D.*

**PERIDIUM (?) INTRICATUM CL.**

(Kongl. Sv. Vet. Akad. Handl. Vol. XXXII n. 3 pag. 31 Pl. II fig. 8.)

1898 *July*: 78° N. 3° W. (deep sea haul).**Plankton-type:** ?**PERIDIUM (?) LAXUM CL.**

(Kongl. Sv. Vet. Akad. Handl. Vol. XXXII n. 3 pag. 31 Pl. II fig. 9.)

1898 *September*: 72° N. 19° E. (deep sea haul).**Plankton-type:** ?**PERIDIUM (?) MINUTUM CL.**(Kongl. Sv. Vet. Akad. Handl. Vol. XXXII n. 3 pag. 31 Pl. III fig. 1. — *Lithonice-  
lissa thoracites* AURIV. non HKL.)1898 *July*: 78° N. 3° W. (deep sea haul).*August*: 72° N. 10° E. (deep sea haul).*November*: 55° N. 44° W.**Temperature:** 6°.**Salinity:** 34.72.**Plankton-type:** ?**PERIPANARTUS AMPHICONUS HKL.**

(Chall. pag. 383 Pl. XL fig. 5.)

1898 *July*: 21° N. 58° W.**Temperature:** 27.5.**Salinity:** 36.37.**Plankton-type.** Found in the central Pacific, abyssal. — *D.* ?

**PERIPANICIUM AMPHICORONA** H<sub>K</sub>L.

(Chall. pag. 387 Pl. XL fig. 8.)

1898 *March*: 9° N. 59° W.  
*December*: 18° N. 67° W.


**Temperature**: 26.1 to 26.8.

**Salinity**: 34.88 to 35.58.

**Plankton-type**. Found in the central Pacific, abyssal. — *D*.

**PHATNASPIS CRISTATA** H<sub>K</sub>L.

(Chall. pag. 869 Pl. CXXXVI fig. 6.)

1898 *March*: 6° S. 4° W.; 23° N. 28° W. 

**Temperature**: 20.9 to 26.8.

**Salinity**: 35.95 to 36.91.

**Plankton-type**. Found in the north Pacific. — *D*.

**PHATNASPIS LACUNARIA** H<sub>K</sub>L.

(Chall. pag. 869 Pl. CXXXVI fig. 9.)

1898 *November*: Azores.

**Temperature**: 18.5.

**Plankton-type**. Found in the central Pacific.

**PHORTICIUM PYLONIUM** H<sub>K</sub>L.

Chall. pag. 709 Pl. XLIX fig. 10. — Cl. Kongl. Sv. Vet. Akad. Handl. Vol. XXXII  
 n. 3 pag. 31 Pl. III fig. 2.)

1898 *July*: 78° N. 3° W. (deep sea haul).  
*August*: 77°—80° N. 12°—10° E. (deep sea haul).  
*September*: 72°—76° N. 19°—15° E. (deep sea haul).  
*October*: 24° S. 36° W.

*November:* 40° N. 67° W.; 50° N. 31° W.; 55° - 56° N. 44° - 30° W.

*December:* 41° N. 66° W.

1899 *January:* 45° N. 49° W.

*February:* 32° N. 47° W.

**Temperature:** 13.5, mean of 9 obs., max. 22, min. 6.

**Salinity:** 35.50, max. 37.21, min. 34.60.

**Plankton-type.** Found in the Mediterranean, Atlantic and Pacific. — S. ? D. ?

### PHRACTASPIS BIPENNIS HKL.

(*Dorastaspis bip.* HKL. Monogr. pag. 413 Pl. XXI fig. 1, 2.)

1898 *January:* 27° N. 37° W.

*July:* 42° N. 48° W.

*December:* Azores.

**Temperature:** 19.7, mean of 3 obs., max. 22, min. 17.2

**Salinity:** 35.63 (one obs.).

**Plankton-type.** Noted from the Canaries and the Mediterranean. — D. ?

### PHRACTASPIS CATAPHRACTA (J. M'ILL.)

(*Acanthometra cataph.* J. M'ILL. Abh. d. Berl. Acad. 1858 pag. 49 Pl. X fig. 7, 8)

1898 *January:* 7° N. 22° W.; 15° N. 70° W.; 32° N. 74°<sup>55'</sup> W.

*February:* 15° N. 71° W.

*March:* 10° N. 53° W.; 28° N. 38° W.

*July:* 33° N. 74° W.

**Temperature:** 24.8, mean of 7 obs., max. 28, min. 19.3.

**Salinity:** 35.91 (one obs.).

**Plankton-type.** Noted from the Canaries and the Mediterranean. — D. ?

**PHRACTASPIS PROTOTYPUS** H<sub>KL</sub>.

(Chall. pag. 809 Pl. CXXXVII fig. 2.)

1898 *February*: 5° S. 4° E.  
*June*: 19° N. 63° W.  
*July*: 39° N. 23° W.  
*September—November*: Azores.

**Temperature**: 22.1, mean of 7 obs., max. 28, min. 18.5.

**Salinity**: 35.77, mean of 5 obs., max. 36.33, min. 34.12.

**Plankton-type**. Found in the eastern tropical Atlantic, the Mediterranean, Indian and Pacific. — S. ?

**PLAGIACANTHA ABIETINA** R. HERTW.

Organ. d. Radiol. Pl. VII fig. 6—6 b.)

1898 *November*: 53° N. 50° W.; 55° N. 44° W.

**Temperature**: 6 to 7.2.

**Salinity**: 34.59 to 34.72.

**Plankton-type**. Found in the Mediterranean. My specimens occurred in Styli- and Tricho-plankton intermingled.

**PLECTANIUM SIMPLEX** CL.

Kongl. Sv. Vet. Akad. Handl. Vol. XXXII n. 3 pag. 32 Pl. III fig. 3.)

1898 *July*: 78° N. 3° W. (deep sea haul).  
*November*: 56° N. 36° W.

**Temperature**: 7.8.

**Salinity**: 35.

**Plankton-type**. ?

**PLECTOPHORA ARACHNOIDES** (CLAP. & LACHM.).<sup>1</sup>

*Plagiacantha ar.* Etudes sur les inf. pag. 462 Pl. XXII fig. 9.)

1898 *March*: 45° N. 13° W.; 40° N. 72° W.  
*April*: 43° N. 50° W.

<sup>1</sup> Ostenfeld's data used.

*May:* Färöes; 62° N. 2° E.

*June:* S. Iceland; 71° N. 22° E.

*July:* 61° N. 1° W.

*August:* Färöes; 76°—78° N. 12°—8° E.

*September:* 64° N. 31° W.; Färöes; 60° N. 2° W.; between Norway and Spitzbergen.

*October:* S. of Iceland; Färöes; 59° N. 16° W.; 57° N. 27° W.; 58° N. 32° W.; 56° N. 31° W.

*November:* 56° N. 30°—36° W.; 53° N. 32° W.; 52° N. 38° W.; 45° N. 52° W.; 42° N. 64° W.; 40° N. 67° W.

*December:* 47° N. 45° W. to 42° N. 65° W.

1899 *January:* 45° N. 49° W.; 44° N. 69° W.

*June:* 62° N. 1° E. (deep sea haul).

*July:* 56°—57° N. 38°—31° W.

*October:* 53° N. 37° W.

*November:* 51° N. 21° W.

**Temperature:** 8.8, mean of 36 obs.; max. 18.2, min. 5.

**Salinity:** 34.36, mean of 35 obs.; max. 35.29, min. 34.96.

**Plankton-type.** *T* and *C*.

### POLYPETTA HOLOSTOMA CL.

(Kongl. Sv. Vet. Akad. Handl. Vol. XXXII n. 3. pag. 32 Pl. III fig. 4.)

1898 *July:* 78° N. 3° W. (deep sea haul).

**Plankton-type.** ?

### PORODISCUS FLUSTRELLA HKL.

(Chall. pag. 491 Pl. XLI fig. 1.)<sub>511</sub>

1898 *August:* 41° N. 50° W.

1899 *January:* 45° N. 49° W.; 48° N. 39° W.

**Temperature:** 11 to 21.1.

**Salinity:** 34.29 to 35.58.

**Plankton-type.** Found in the Atlantic and Pacific. S. ?

**PORODISCUS HETEROCYCLUS** H<sub>KL</sub>.

(Monogr. pag. 493 Pl. XXIX fig. 3.)

1898 *May*: 61° N. 1° W.**Temperature**: 7.5.**Salinity**: 35.46.**Plankton-type**. Found in the Mediterranean, Atlantic and Pacific. — S.**PSILOMELISSA GALEATA** E<sub>HB</sub>.(E<sub>HB</sub>. Abh. d. Berl. Akad. 1872 Pl. VII fig. 25.)1898 *February*: 15° N. 71° W.*March*: 15° N. 49° W.*May*: 44° N. 51° W.*July*: 42° N. 48° W.**Temperature**: 24, mean of 3 obs., max. 27, min. 19.**Salinity**: 35.63 to 36.01.**Plankton-type**. Found in the western tropical Pacific. — D.**PSILOMELISSA LONGISPINA** C<sub>L</sub>.

(Kongl. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. IV fig. 4.)

1898 *January*: 32° N. 74° W.*May*: 41° N. 51° W.*December*: 18° N. 67° W.**Temperature**: 21.8, mean of 3 obs., max. 26.8, min. 19.**Salinity**: 34.88 to 36.01.**Plankton-type**: D.**PTEROCANIUM PRÆTEXTUM** (E<sub>HB</sub>.)(*Lychnocanium* pr. E<sub>HB</sub>. Abh. d. Berl. Akad. 1872 Pl. X fig. 2. — *P. tricoloratum* H<sub>KL</sub>. included.)1898 *January*: 12° N. 50° W.; 15° N. 70° W.; 25° N. 74° W.*February*: 21° N. 74° W.*March*: 12° N. 51° W.

*April*: 12° N. 51° W.

*June*: 10° N. 53° W.

*July*: 21° N. 58° W.; 25° N. 74° W.; 29° N. 74° W.; 33° N. 74° W.

*August*: 22° N. 74° W.; 25° N. 74° W.; 34° N. 73° W.

*September*: 9° N. 53° W.; 15° N. 70° W.; 33° N. 74° W.

*October*: 21° S. 36° W.; 26° N. 76° W.

*November*: 22° N. 53° W.; 32° N. 38° W.; 34° N. 33° W.; 47° N. 44° W.

*December*: 18° N. 67° W.

1899 *January*: 7° N. 53° W.

*June*: 14° S. 6° W.; 12° N. 52° W.; 15° N. 50° W.; 21° N. 45° W.

**Temperature**: 25.<sub>2</sub>, mean of 27 obs., max. 28, min. 16.

**Salinity**: 36.<sub>20</sub>, mean of 20 obs., max. 37.<sub>21</sub>, min. 34.<sub>05</sub>.

**Plankton-type**. Noted from Zanzibar and Ceylon. *P. tricolum*, which seems to me not to differ specifically, is found in the Atlantic and Pacific. — According to the above data this species occurs in the tropical, western Atlantic, in November in the region of the Newfoundland Banks. — *D.*

### PTEROCORYS CAMPANULA H&L.

(Chall. pag. 1316 Pl. LXXI fig. 3.)

1897 *December* and

1898 *January*: 12° N. 50° W.; 15° N. 70° W.

*February*: 15° N. 71° W.

*March*: 9° N. 59° W.; 15° N. 49° W.

*September*: 9° N. 53° W.; 15° N. 70° W.; 41° N. 65° W.

*November*: 19° N. 58° W.

*December*: 18° N. 67° W.

**Temperature**: 26.<sub>8</sub>, mean of 8 obs., max. 28, min. 26.<sub>1</sub>.

**Salinity**: 35.<sub>05</sub>, mean of 5 obs., max. 35.<sub>58</sub>, min. 34.<sub>05</sub>.

**Plankton-type**. Found in the central Pacific. — According to the above data this species occurs in the tropical western Atlantic and advances in September beyond 41° N. — *D.*



**PTEROCORYS IRREGULARIS** CL.

(Kongl. Sv. Vet. Akad. Handl. Vol. XXXII n. 3 pag. 32 Pl. IV fig. 1.)

1898 *March*: 62° N. 2° E.*July*: 78° N. 3° W. (deep sea haul).*November*: 56° N. 23° W.**Temperature**: 10.<sub>s</sub>.**Salinity**: 35.<sub>32</sub>.**Plankton-type**. S. ?**PTEROSCENIUM ARCUATUM** H<sub>KL</sub>.

(Chall. pag. 1152 Pl. XCVIII fig. 4.

1898 *January*: 43° — 44° N. 17° W.; 46° N. 11° W.1899 *November*: 51° N. 21° W.**Temperature**: 12.<sub>s</sub> to 14.<sub>2</sub>.**Plankton-type**. Found in the central Pacific, abysmal. My specimens were found in Styli- and Tricho-plankton intermingled.**QUADRILONCHE CRUX** CL.

(Kongl. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. IV fig. 1.)

1898 *January*: 4° S. 29° W.; 29° N. 74° W.*Februari*: 15° N. 71° W.; 26° N. 74° W.*March*: 10° N. 53° W.; 9° N. 59° W.*June*: 19° N. 63° W.*July*: 15° N. 71° W.; 21° N. 58° W.*November*: 26° N. 48° W.*December*: 26° S. 45° W.; 18° N. 67° W.1899 *April*: 36° N. 74° W.**Temperature**: 25.<sub>1</sub>, mean of 13 obs., max. 28, min. 21.<sub>7</sub>.**Salinity**: 36.<sub>40</sub>, mean of 8 obs., max. 37.<sub>43</sub>, min. 34.<sub>88</sub>.**Plankton-type**. This species occurs in the western tropical Atlantic. — *D*.

**RHAPHIDZOUM PATAGONICUM** H<sub>KL</sub>.

(Chall. pag. 48.)

1898 *March*: 7° N. 17° W.

**Temperature**: 27.8.

**Salinity**: 35.25.

**Plankton-type**: *D*.

**SAGENOSCENA PENICILLATA** H<sub>KL</sub>.

(Chall. pag. 1611 Pl. CVIII fig. 10.)

1898 *July*: 78° N. 3° W. (deep sea haul).

**Plankton-type**. Found in the Antarctic Ocean, abysmal.

**SEMANTIS DISTEPHANUS** H<sub>KL</sub>.

(Chall. pag. 957 Pl. LXXXIII fig. 3.)

1897 *December*: 12° N. 50° W.

1898 *January*: 7° N. 53° W.

*November*: 56° N. 23° W.

**Temperature**: 21.2, mean of 3 obs., max. 26.5, min. 10.5.

**Salinity**: 35.32 (one obs.).

**Plankton-type**. Noted from the north of Ascencion. — *D*.

**SETHOCONUS CRINITUS** CL.

(Kongl. Sv. Vet. Akad. Handl. Vol. XXXIV Pl. III fig. 13.)

1898 *January*: 7° N. 53° W.

*March*: 8° N. 59° W.

*May*: 23° N. 56° W.

*June*: 10° N. 53° W.; 19° N. 63° W.

*July*: 41° N. 58° W.

*August*: 22° N. 74° W.

*September*: 33° N. 74° W.

1899 *April*: 28° N. 75° W.

**Temperature**: 25.8, mean of 8 obs., max. 28, min. 22.1.

**Salinity:** 35.52, mean of 7 obs., max. 36.56, min. 33.88.

**Plankton-type.** Belongs to the western tropical Atlantic. *D.*

### SETHOCONUS GALEA CL.

(Kongl. Sv. Vet. Akad. Handl. Vol. XXXII n. 3 pag. 28 Pl. IV fig. 3.)

1898 *July*: 78° N. 3° W. (deep sea haul).

**Plankton-type:** ?

### SETHOCONUS ORTHOCERAS HKL.

(Chall. pag. 1294 Pl. LIV fig. 11.)

1899 *January*: 45° N. 49° W.

**Temperature:** 12.

**Salinity:** 35.54.

**Plankton-type.** The only specimen seen was found in Stylian Tricho-plankton intermingled. Noted from 37° S. 46 W. S.

### SETHOCYRTIS PYRUM CL.

(Kongl. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. IV fig. 6.)

1899 *January*: 45° N. 49° W.

**Temperature:** 12.

**Salinity:** 35.51.

**Plankton-type:** ?

### SIPHONOSPHERA CYATHINA HKL.

(Chall. pag. 105 Pl. VI fig. 10.)

1898 *February*: 30° N. 74° W.

*March*: area between 26° N. 29° — 39° W., 28° N. 38° W. and 36° N. 29° W.

*May*: 29° N. 39° W.; 30° N. 42° W.

*June*: area between 23° N. 42° W. — 24° N. 58° W. and 31° N. 50° W.; 41° N. 34° W.

*July*: 33° N. 74° W.

*September*: 33° N. 31° W.

*October*: 21° S. 36° W.

1899 *June*: 21° N. 45° W.

*July*: 35° N. 40° W.

**Temperature**: 28.8, mean of 16 obs., max. 27, min. 17.3.

**Salinity**: 36.68, mean of 13 obs., max. 37.2, min. 35.91.

**Plankton-type**. Noted from the west of tropical Africa. — *D*.

### SIPHONOSPHERA SOCIALIS HILL.

(Chall. pag. 106 Pl. VI fig. 1, 2.

1897 *December* and

1898 *January*: 16° N. 18° W.; 29° N. 36° W.

*February*: 13° N. 70° W.

*March*: 22—23° N. 43—42° W.; 28° N. 38° W.; 37—39° N.  
24—25° W.

*May*: 26° N. 42° W.

*June*: 27° N. 55° W. to 43° N. 29° W.

*August*: 41° N. 50° W.; Azores.

*September*: 26° N. 39° W.

*October*: 21° S. 36° W.

*November*: 19° N. 58° W.; 24° N. 21° W.

*December*: 34° N. 38° W.

1899 *March*: 24° N. 40° W.; 37° N. 26° W.

*June*: 8—9° S. 13—12° W.; 35° N. 40° W.

*July*: 11° N. 26° W.

**Temperature**: 22.5, mean of 26 obs., max. 27.5, min. 14.9.

**Salinity**: 36.38, mean of 20 obs., max. 37.34, min. 34.29.

**Plankton-type**. Found in the tropical and sub-tropical eastern Atlantic. According to the above data it occurs in the Sargasso Sea the Caribbean Sea and to 43° N. — *D*.

## SPERMATOGONIA ANTIQUA LEUD-FORTM.

Diatomées de la Malaisie, Ann. du Jardin botanique de Buitenzorg. Vol. XI fig. 8.  
 Cl. K. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 pag. 11.)

1897 *December* and

1898 *January*: 12° N. 50° W.; 35° N. 74° W.

*February*: 21° N. 74° W.

*March*: 41° N. 23° W.

*May*: 11° N. 52° W.

*July*: 33°—38° N. 74° W.; 40°—44° N. 67°—60° W.

*August*: 22°—30° N. 74° W.; 42° N. 62° W.; 45° N. 43° W.

*September*: 9° N. 53° W.; 15° N. 71° W.; 20°—29° N. 74° W.;  
 41° N. 65° W.; 42° N. 57° W.

*October*: 30° N. 74° W.

*November*: Rio Janeiro; 56° N. 30°—23° W.

*December*: 18° N. 67° W.; 29° N. 49° W.

**Temperature**: 24.5, mean of 26 obs., max. 28.1, min. 9.6.

**Salinity**: 35.39, mean of 23 obs., max. 36.40, min. 33.92.

**Plankton-type**. Noted from the Malay Archipelago. — *D.*

## SPHÆROZOOM PUNCTATUM J. MILL.

(Hktl. Monogr. pag. 528 Pl. XXXIII fig. 7—9.)

1898 *January*: 21° N. 43° W.

*February*: 26° N. 74° W.

*March*: 15° N. 49° W.; 36° N. 29° W.

*April*: 44° N. 19° W.; 45° N. 16° W.; 47° N. 32° W.

*May*: 34°—36° N. 32°—27° W.; 46° N. 38° W.

*June*: 44° N. 16° W.

*July*: Azores.

*November*: 26°—24° S. 30°—29° W.; 26° N. 48° W.

**Temperature**: 19.1, mean of 15 obs., max. 23.5, min. 13.6.

**Salinity**: 36.22, mean of 11 obs., max. 37.18, min. 35.65.

**Plankton-type**. Found in the Mediterranean, Atlantic, Indian and Pacific. — *S.* and *D.*

**SPIROCYRTIS SCALARIS** HKL.

(Chall. pag. 1509 Pl. LXXVI fig. 14.

1898 *December*: 18° N. 67° W.**Temperature**: 26.8.**Salinity**: 34.88.**Plankton-type**. Found in the central Pacific, abyssal. My specimen was found in Styli- and Desmo-plankton intermingled.**SPONGASTER TETRAS** EHB.

(Ehb. Abh. d. Berl. Akad. 1872 Pl. VI 3. fig. 8.

1898 *February*: 15° N. 71° W.*September*: 24° N. 74° W.*November*: 0° S. 31° W.; 19° N. 58° W.; 22° N. 53° W.; 47° N. 41° W.1899 *April*: 28° - 34° N. 75° - 74° W.*June*: 19° S. 0° W. to 3° S. 20° W.**Temperature**: 24.6, mean of 13 obs., max. 28, min. 16.**Salinity**: 36.05, mean of 11 obs., max. 36.61, min. 35.22.**Plankton-type**. Found in the Atlantic, Indian and Pacific.  
— *D*.**SPONGODISCUS MEDITERRANEUS** HKL.

(Monogr. pag. 461 Pl. XII fig. 14, 15.

1898 *January*: 15° N. 71° W.*August*: 40° N. 67° W.*December*: 25° N. 52° W.**Temperature**: 24 to 27.**Salinity**: 34.18 to 37.17.**Plankton-type**. Found in the Mediterranean. — *D*.**SPONGOSPHERA POLYACANTHA** J. MÜLL.

(Abh. d. Berl. Akad. 1858 pag. 32 Pl. IV fig. 1-4.

1898 *November*: Azores.**Temperature**: 18.5.**Plankton-type**. Noted from the Mediterranean and the Canaries.  
— S. ?

**SPONGOSPHERA STREPTACANTHA** HKL.

(Monogr. pag. 455 Pl. XXVI fig. 1—3.)

1897 *December*: 45° N. 13° W.1898 *February*: 5° S. 4°—9° E.*March*: 43° N. 17° W.*August*: 17° N. 71° W.*October*: 21° S. 36° W.*December*: Azores.1899 *January*: 45° N. 49° W.**Temperature**: 20.<sub>2</sub>, mean of 8 obs., max. 28, min. 12.**Salinity**: 35.<sub>12</sub>, mean of 5 obs., max. 37.<sub>21</sub>, min. 33.<sub>93</sub>.**Plankton-type**. Common in all warmer seas (HKL.) S.  
(and D. ?)**SPONGOTROCHUS LONGISPINUS** HKL.

(Monogr. pag. 463 Pl. XXVII fig. 2, 3.)

1898 *February*: 15° N. 71° W.*March*: 49° N. 18° W.*April*: 49° N. 22° W.; 50° N. 9° W.*September*: 15° N. 71° W.**Temperature**: 19.<sub>9</sub>, mean of 4 obs., max. 28.<sub>4</sub>, min. 11.<sub>2</sub>.**Salinity**: 35.<sub>25</sub>, mean of 4 obs., max. 35.<sub>65</sub>, min. 34.<sub>96</sub>.**Plankton-type**. Found in the Mediterranean. — S. ?**STAURACANTHA MURRAYANA** HKL.

(Xiphacantha Murr. Chall. Report Narrative I pag. 222 fig. 89.)

1898 *March*: 14° N. 50° W.**Temperature**: 25.<sub>2</sub>.**Salinity**: 36.<sub>21</sub>.**Plankton-type**. Noted from 37° S. 28° W. — D.

**STAURACANTHA ORTHOSTAURA** Hkl.

(Chall. pag. 762 Pl. CXXX fig. 5.)

1898 *February*: 5° S. 9° E.**Temperature**: 27.3.**Salinity**: 33.93 (anomalous).**Plankton-type**. Noted from the south Pacific. My specimen was found in Desmo- and Styli-plankton intermingled. — *D.* ?**STAURACANTHA QUADRIFURCA** Hkl.<sup>1</sup>

(Chall. pag. 764 Pl. CXXX fig. 4.)

1898 *January*: 11° N. 52° W.*February*: 26° N. 74° W.*April*: 45° N. 16° W.*June*: 33° N. 48° W.*August*: 40° N. 66° W.*November*: Azores.1899 *June*: 25° S. 7° E.**Temperature**: 20.5, mean of 8 obs., max. 25, min. 13.**Salinity**: 35.28, mean of 4 obs., max. 36.33, min. 33.93.**Plankton-type**. Noted from 37° S. 46° W. and 38° S. 33° W.  
— *D.* ? *S.* ?**STICHOPILIUM DAVISIANUM** (Emm.)

(Cl. K. Sv. Vet. Akad. Handl. Vol. XXXII n. 3 pag. 33 Pl. IV fig. 6.)

1898 *July*: 78° N. 3° W. (deep sea haul).*September*: 76° N. 15° E. (deep sea haul).**Plankton-type**. Found in bottom-mud from Greenland. — ?

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<sup>1</sup> Very doubtful as species and scarcely different from *S. stauruspis*. Both probably the young state of some *Tessaraspis*.



**STYLODICTYA ARACHNIA** (J. MÜLL.)

(*Stylocyelia ar.* MÜLL. Abh. d. Berl. Akad. 1858 pag. 41 Pl. I fig. 8, 9.)

- 1898 *January*: 7° N. 53° W.; 30° N. 34° W.  
*February*: 15° N. 71° W.; 30° N. 74° W.  
*March*: 41° N. 23° W.; 49° N. 18° W.  
*May*: 26° N. 42° W.  
*September*: 23° N. 42° W.  
*October*: 21° S. 36° W.; 26° N. 76° W.  
*November*: 19° N. 58° W.; 22° N. 53° W.; 56° N. 23° W.  
*December*: 25° N. 52° W.; 28° N. 47° W.; 34° N. 38° W.;  
 29° N. 14° W.
- 1899 *January*: 33° N. 15° W.  
*December*: 32° N. 47° W.  
*March*: 27° N. 37° W.

**Temperature:** 20.9, mean of 21 obs., max. 27.3, min. 10.8.

**Salinity:** 35.56, mean of 17 obs., max. 37.51, min. 35.22.

**Plankton-type.** Found in the Atlantic, Mediterranean, Indian and Pacific. — *D.*

**STYLODICTYA GRACILIS** EHB.

(Abh. d. Berl. Akad. 1875 Pl. XXIII fig. 3.)

- 1898 *December*: 31° N. 43° W.; 40° N. 23° W.

**Temperature:** 17 to 20.

**Salinity:** 36.30 to 36.19.

**Plankton-type.** Found in the Atlantic and Pacific. — *D.*

**STYLODICTYA HELIOSPIRA** HÜKL.

(Chall. pag. 512 Pl. XII fig. 8.)

- 1899 *January*: 45° N. 49° W.

**Temperature:** 12.

**Salinity:** 35.51.

**Plankton-type.** Found in the Mediterranean. — *S.*

**STYLODICTYA MULTISPINA** H<sub>KL</sub>.

(Monogr. pag. 496 Pl. XXIX fig. 5.)

- 1898 *February*: 13° N. 70° W.  
*March*: 41° N. 24° W.; 49° N. 18° W.  
*October*: 21° S. 36° W.  
 1899 *January*: 45° N. 49° W.  
*March*: 47° N. 8° W.

**Temperature**: 17.1, mean of 5 obs., max. 26.1, min. 11.**Salinity**: 36.19, mean of 3 obs., max. 37.21, min. 35.65.**Plankton-type**. Found in the Atlantic, Mediterranean, Indian, Pacific. — *S.* ? (*D.* ?)**TESSARASPIS ARACHNOIDES** H<sub>KL</sub>.

(Chall. pag. 836 Pl. CXXXVI fig. 1.

- 1898 *January*: 7° — 11° N. 53° — 52° W.  
*March*: 4° S. 10° W.; 3° N. 16° W.; 26° N. 29° W.; 9° N. 59° W.; 17° N. 47° W.  
*April*: 31° N. 75° W.  
*May*: 21° N. 48° W.; 13° N. 51° W.; 23° N. 56° W.; 26° N. 52° W.; 20° N. 60° W.  
*June*: 19° N. 63° W.; 23° N. 42°<sup>4</sup> W.; 24° N. 58° W.  
*September*: 20° N. 74° W.  
*October*: Azores.  
*November*: 13° N. 26° W.; 34° N. 10° W.; 36° N. 14° W.; 22° N. 53° W.; 19° N. 58° W.; 32° N. 38° W.  
*December*: 26° S. 45° W.; 19° N. 58° W.

**Temperature**: 24.1, mean of 22 obs., max. 28.3, min. 17.5.**Salinity**: 36.19, mean of 19 obs., max. 37.41, min. 34.86.**Plankton-type**. Found in the tropical Atlantic, west of Africa.  
— *D.*

**TETRAPYLE QUADRILOBA** EHB.

(*Schizomma quadr.* EHB. Abh. d. Berl. Akad. 1872 Pl. X fig. 12—14.)

1898 *January*: 7° N. 53° W.; 15° N. 70° W.

*February*: 21° N. 74° W

*March*: 10° N. 53° W.

*November*: 19° N. 58° W

*December*: 25° N. 54° W

1899 *June*: 12° S. 9° W.

**Temperature**: 25.<sub>6</sub>, mean of 7 obs., max. 27.<sub>5</sub>, min. 22.

**Salinity**: 36.<sub>36</sub>, mean of 3 obs., max. 37.<sub>17</sub>, min. 35.<sub>22</sub>.

**Plankton-type**. Found in the Atlantic, Mediterranean, Indian and Pacific. — *D*.

**THEOCALYPTRA CORNUTA** (BAIL.)

(*Carpocanium calyptra* EHB. Abh. d. Berl. Akad. 1872 pag. 287 Pl. II fig. 9.)

1898 *March*: 63° N. 2° E.; 71° N. 1° W.

*July*: 78° N. 3° W. (deep sea haul).

*August*: 80° N. 10° E. (deep sea haul).

*September*: 76° N. 15° E. (deep sea haul).

*November*: area between 56° N. 26° W.; 52° N. 38° W. and 55° N. 44° W.

*December*: 41° N. 66° W.

1889 *March*: 65° N. 13° W.

*October*: 53° N. 31° W.

*November*: 51° N. 21° and 34° W.

**Temperature**: 7.<sub>7</sub>, mean of 9 obs., max. 22, min. 2.<sub>8</sub>.

**Salinity**: 30.<sub>02</sub>, mean of 9 obs., max. 35.<sub>36</sub>, min. 34.<sub>72</sub>.

**Plankton-type**. Found in bottom-mud from Kamtchatka and Greenland. The non occurrence of this species in the southern Atlantic and its occurrence at Kamtchatka, as well as the low temperature, point to the conclusion that this species arrived ultimately from the northern Pacific through the Polar basin.

**THEOCAPSA DEMOCRITI** H<sub>KL</sub>.

(Chall pag. 1427 Pl. LXXVI fig. 8.)

1899 *June*: 6 S. 16° W.**Temperature**: 26.7.**Salinity**: 35.15.**Plankton-type**. Found in the central Pacific, abysmal. -- *D*.**THEOCONUS JUNONIS** H<sub>KL</sub>. ?

(Kongl. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. IV fig. 8.)

*March*: 62° N. 2° E.**Temperature**: 7.4.**Salinity**: 35.12.**Plankton-type**. My specimen was found in Tricho-plankton (very poor). — ?**THEOCONUS ZANCLEUS** (J. MÜLL.).(*Eucyrtid. zancle*. MÜLL. Abh. d. Berl. Akad. 1858 pag. 41 Pl. VI fig. 1—3.)1897 *December* and1898 *January*: 7° N. 53° W.; 12° N. 50° W.; 15° N. 70° W.*Februari*: 15° N. 71° W.; 26° N. 74° W.*March*: 9° N. 59° W.; 39—41° N. 25°—23° W.*April*: 12° N. 51° W.; 14° N. 70° W.*May*: 16° N. 71° W.*July*: 31° N. 39° W.; 26° N. 48° W.; 21° N. 58° W.; 25—33° N. 74° W.*August*: 22°—25° N. 74° W.*September*: 9° N. 53° W.; 41° N. 65° W.; 15° N. 71° W.; 33° N. 74° W.*October*: 26° N. 76° W.*November*: 22° N. 53° W.*December*: 49° N. 30° W.; 19° N. 58° W.; 43° N. 57° W.1899 *February*: 32° N. 47° W.*June*: 15° N. 49° W.

**Temperature:** 24.2, mean of 29 obs., max. 28.4, min. 13.

**Salinity:** 35.88, mean of 22 obs., max. 37.04, min. 34.05.

**Plankton-type.** Found in the Mediterranean. — *D.*

### THEOCORYS BOREALIS CL.

(K. Sv. Vet. Akad. Handl. Vol. XXXII n. 3 pag. 33 Pl. III fig. 5.)

1898 *July*: 78° N. 3° W. (deep sea haul).

*August*: 80° N. 10° E. (deep sea haul).

*September*: 76° N. 15° E. (deep sea haul).

*January*: 45° N. 49° W.

**Temperature:** 12 (one obs.).

**Salinity:** 35.54 (one obs.).

**Plankton-type.** My only specimen from the surface was found in Styli- and Tricho-plankton intermingled.

### THEOCYRTIS ACULEATA CL.

(K. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. IV fig. 11)

1898 *November*: 56° N. 17° and 23° W.; 48° N. 29° W.

**Temperature:** 12.5, mean of 3 obs., max. 15, min. 10.8.

**Salinity:** 35.34, mean of 3 obs., max. 35.44, min. 35.27.

**Plankton-type.** S. ? T. ?

### THEOCYRTIS TURRIS CL.

(K. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. IV fig. 7.)

1899 *January*: 45° N. 49° W,

**Temperature:** 12.

**Salinity:** 35.54.

**THEOPILIUM TRICOSTATUM** H<sub>K</sub>L.(Chall. pag. 1322 Pl. LXX fig. 6 *Lamprodiscus tricostratus* H<sub>K</sub>L. included.)1897 *December*: 12° N. 50° W.1898 *February*: 13°—16° N. 70°—71° W.*March*: 9° N. 59° W.; 45° N. 13° W.; 48° N. 6° W.*April*: 7° N. 54° W.*May*: 41° N. 59° W.*July*: 26° N. 48° W.*August*: 25° N. 74° W.*September*: 15° N. 70° W.; 33° N. 74° W.; 41° N. 65° W.; 23° N. 42° W.; 32° N. 33° W.*October*: 21° S. 36° W.; 26° N. 76° W.; 56° N. 10° W.*November*: 56° N. 23°—30° W.*December*: 18° N. 67° W.**Temperature**: 22.1, mean of 19 obs., max. 28, min. 9.6.**Salinity**: 35.87, mean of 11 obs., max. 37.51, min. 34.43.**Plankton-type**. Found in the central Pacific. — *D*.**THOLOSPIRA CERVICORNIS** H<sub>K</sub>L.

(Chall. pag. 700 Pl. XLIX fig. 4, 5.)

1898 *March*: 44° N. 17° W.*November*: 56° N. 17° W.**Temperature**: 11.6 to 12.4.**Salinity**: 35.25.**Plankton-type**. Found in the central Pacific. — *S*.?**TROCHODISCUS ECHINIDISCUS** H<sub>K</sub>L.

(Cl. K. Sv. Vet. Akad. Handl. Vol. XXXII n. 3 pag. 34 Pl. IV fig. 4.)

1898 *July*: 78° N. 3° W. (deep sea haul).**Plankton-type**. Found in the Färöe Channel.

## TROCHODISCUS HELIOIDES CL.

(K. Sv. Vet. Akad. Handl. Vol. XXXII n. 3 pag. 34 Pl. IV fig. 5.)

1897 *December*: 12° N. 50° W.1898 *February*: 15° N. 70°—71° W.*March*: 9° N. 59° W.*July*: 79° N. 10° E. (deep sea haul).*November*: 55° N. 44° W.**Temperature**: 21.4, mean of 4 obs., max. 27, min. 6.**Salinity**: 34.7 to 35.58.**Plankton-type**: *D.* ?

## TRYPANOSPHERA BRACHYSIPHON CL.

(K. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. VI fig. 3.)

1898 *November*: 56° N. 17° W.*December*: 41° N. 66° W.**Temperature**: 11.6 to 12.**Salinity**: 34.60 to 35.25.**Plankton-type**. ?

## XANTIOSPHERA LAPPACEA HKL.

(Chall. pag. 120 Pl. VIII fig. 10, 11.)

1899 *June*: 33° N. 48° W.*December*: 41° N. 66° W.1899 *April*: 28° N. 75° W.**Temperature**: 19.5, mean of 3 obs., max. 24, min. 12.**Salinity**: 34.79, mean of 3 obs., max. 36.42, min. 34.60.**Plankton-type**. Found in the central Pacific. — *D.* ?

**XIPHACANTHA CILIATA** H<sub>KL</sub>.

(Chall. pag. 761 Pl. CXXIV fig. 4, 5.)

1898 *March*: 4° S. 10° W.**Temperature**: 26.<sub>s</sub>.**Salinity**: 35.<sub>39</sub>.**Plankton-type**. Noted from the eastern tropical Atlantic, between 10° S. 14° W and 11° N. 18° W. My specimens were found among Desmo-plankton. — *D*.**XIPHACANTHA PLATYPTERA** H<sub>KL</sub>.

(Chall. pag. 761.)

1898 *January*: 10° N. 52° W.*March*: 14° N. 24° W.; 23° N. 28° W.; 41° N. 23° W.*April*: 41° N. 19° W.**Temperature**: 19.<sub>1</sub>, mean of 5 obs., max. 25, min. 13.**Salinity**: 36.<sub>10</sub>, mean of 4 obs., max. 36.<sub>91</sub>, min. 35.<sub>78</sub>.**Plankton-type**. Found in the Pacific. — *S*. ?**XIPHACANTHA QUADRIDENTATA** (J. MÜLL.)(H<sub>KL</sub>. Monogr. pag. 387 Pl. XVIII fig. 15 a, b.)1897 *December*: 16° N. 48° W.**Temperature**: 25.<sub>s</sub>.**Plankton-type**. Found in the Mediterranean, west of Africa and the Azores. — *S*. ? *D*. ?**ZYGACANTHA LANCEOLATA** (J. MÜLL.)(*Acanthometra l.* MÜLL. Abh. d. Berl. Akad. 1858 pag. 48 Pl. XI fig. 12.)1898 *February*: 5° S. 9° E.**Temperature**: 27.<sub>s</sub>.**Salinity**: 33.<sub>93</sub> (anomalous).**Plankton-type**. Noted from the Canaries and the Mediterranean. — *S*. ?



**ZYGOCIRCUS PRODUCTUS** (R. HERTWIG.)*(Lithocircus prod.* HERTW. Organism. d. Radiol. Pl. VII fig. 4.)1898 *February*: 34° N. 73° W.*March*: 12° N. 51° W.*May*: 41° N. 51° W.*September*: 25°—33° N. 74° W.*October*: 26° N. 76° W.**Temperature**: 24.<sub>3</sub>, mean of 6 obs., max. 28, min. 19.**Salinity**: 36.<sub>18</sub>, mean of 4 obs., max. 36.<sub>30</sub>, min. 36.<sub>01</sub>.**Plankton-type**. Found in the Atlantic, Mediterranean and Pacific. — *D*.**ZYGOCIRCUS RHOMBICUS** H<sub>KL</sub>.

(Chall. pag. 946.)

1898 *February*: 16° N. 71° W**Temperature**: 20.<sub>7</sub>.**Plankton-type**. Found in the south Atlantic. — *D*. ? *S*. ?**ZYGOCIRCUS TRIQUETRUS** H<sub>KL</sub>.

(Chall. pag. 947 Pl. 81 fig. 3.)

1898 *February*: 16° N. 71° W**Temperature**: 20.<sub>7</sub>.**Plankton-type**. Found in the Atlantic, Mediterranean and Pacific. — *D*. ? *S*. ?**ZYGOSTAURUS SAGITTALIS** H<sub>KL</sub>.

(Chall. pag. 775 Pl. CXXXI fig. 8.)

1897 *December*: 12° N. 50° W.*February*: 26° N. 74° W.*March*: 23° N. 28° W**Temperature**: 23.<sub>7</sub>, mean of 3 obs., max. 26.<sub>5</sub>, min. 20.<sub>9</sub>.**Salinity**: 36.<sub>91</sub> (one obs.).**Plankton-type**. Found in the central Pacific. — *D*.

## Rhizopoda.

### GLOBIGERINA BULLOIDES D'ORB.<sup>1</sup>

(BRADY: Challenger Reports, Foraminifera pag. 593 Pl. LXXVII, LXXIX fig. 3—7  
*G. pachyderma* included.)

1898 *January*: 21° N. 17° W. to 4° S. 29° W.; 7°—11° N. 53°—52° W.; Caribbean Sea to 37° N. 74° W.; 41° N. 21° W. to 46° N. 11° W.

*February*: 5° S. 4°—9° W.; Caribbean Sea to 34° N. 73° W.

*March*: area between 4° S. 10° W., 1° S. 27° W. and Cape Verde; area between 9° N. 53°—59° W. and 25° N. 41° W.; area between 36° N. 29° W., 45° N. 13° W., 51° N. 27° W. and 42° N. 51° W.

*April*: Caribbean Sea to 31° N. 75° W.; area between the Engl. Channel, 59° N. 22°—33° W. and 42° N. 61° W.

*May*: some spots in the Sargasso Sea, between 32° N. 37° W., 13° N. 51° W. and 20° N. 60° W.; area between the Azores, Cape Finisterre, Rockall, the Shetlands, 61° N. 23°—28° W. and 41° N. 56° W.

*June*: 19° N. 63° W. to 25° N. 57° W.; Caribbean Sea; Sargasso Sea at some points between 19° N. 63° W., 33° N. 48° W.; 29° N. 36° W. and 23° N. 42° W.; area between Maderia, Cape Finisterre, 48° N. 17° W. and 37° N. 41° W.; 57° N. 28°—34° W.; 72° N. 22° E. (AURIV.)

*July*: 21° N. 58° W.; 26° N. 48° W.; 40° N. 69° W.; Azores; 58° N. 23°—40° W., as a rule common; 61° N. 4° W.; 62° N. 0° W.; 64° N. 3° W.; 78° N. 1° E.—3° W. (deep sea hauls, AURIV.)

<sup>1</sup> Ostenfeld's data, signed + and +, used.

*August*: Caribbean Sea; Azores; 47° N. 39° W.; 54° N. 47° W. to 56° N. 28° W.; 56° N. 13° W.; 63° N. 18° W. to 61° N. 8° W.; 76° N. 11°—12° E.; 77° N. 8° E.; 81° N. 23° E. (AURIV.); 76° N. 12° E. to 80° N. 10° E. (deep sea hauls, AURIV.)

*September*: Caribbean Sea; 33°—38° N. 74° W.; 41° N. 65° W.; Azores; 47° N. 14° W.; 46° N. 39° W.; 53° N. 50° W.; area between the Shetlands, N. Iceland, E. Greenland (65° N. 36° W.), 58° N. 39° W. and 56° N. 12°—35° W.; between Norway and Beeren Island.

*October*: Caribbean Sea; 34° N. 74° W.; 32° N. 33° W.; Azores; 56° N. 10°—31° W.; N. of Scotland; Färöe Channel; S. of Iceland; 58° N. 48° W.

*November*: 34°—36° N. 10°—14° W.; area between 53° N. 50° W., 42° N. 64° W. and 52° N. 38° W.; 56° N. 17°—23° W.; S. of Iceland to the Färöes and the Shetlands.

*December*: Canaries; 44° N. 56° W.; S. of Iceland; N. of Scotland.

1899 *January*; 33° N. 14° W. to 35° N. 9° W.

*April*: 48° N. 9° W.; 44° N. 15° W.

*May*: 50° N. 33°—39° W.; 60° N. 1° E.

*June*: 25° S. 7° E.; 6° S. 16° W. to 3° S. 20° W.; 66°—67° N. 3° W. to 69° N. 13° W.; 64° N. 0° E., common in the depth of 450—200 metres, var. pachyderma; 72° N. 18° E.

*July*: rare in the deeper strata E. of Greenland, 71°—72° N. 21°—22° W. (var. pachyderma); 56° N. 38° W.

*August*: 55° N. 9° W. to 54° N. 46° W., sparingly.

*September*: 56° N. 12°—33° W., not rare; 65° N. 2° W. to 68° N. 8° W., on the whole rare.

*October*: 53°—56° N. 37°—38° W. to 56° N. 31° W., rare.

*November*: 53° N. 43°—48° W. to 48° N. 46° W., rare.

**Temperature**: 17.<sub>6</sub>, mean of 157 obs., max. 28.<sub>4</sub>, min. 5.<sub>3</sub>.

**Salinity**: 35.<sub>61</sub>, mean of 114 obs., max. 37.<sub>04</sub>, min. 32.<sub>87</sub>.

**Plankton-type**. Globigerina was found 1899 in June west of S. Africa (25° S.) and appeared again in the region of Ascension. It follows the Equatorial current to the north coast of S. America, enters the Caribbean Sea and follows the Florida current, whence it spreads into the Sargasso Sea, but occurs there on the whole

rarely. On the other hand it follows the African coast to Cape Verde and the Azores. In March and May it occurred across the whole Atlantic between 35° and 50° N., from the English Channel to New York. In May it was not rare along 60° N. from 30° W. to the Shetlands, had in August reached Spitzbergen and Iceland. In September it was not rare in the whole Irminger Sea and was seen also N. of Iceland. It still remained, in October and November, between Iceland and the Shetlands, but was in December remarkably rare in the whole Atlantic. — *S.* (exceptionally *D.*)

### PULVINULINA MENARDI (D'ORB.)

(BRADY: Rep. Challenger Foraminifera pag. 690 Pl. CIII fig. 1, 2.)

1898 *January*: 7° N. 53° W.

*March*: 4° S. 11° W.

1899 *May*: 25° S. 7° E.

*June*: 20° S. 1° E. to 3° S. 21° W.

**Temperature:** 19° to 27°.

**Salinity:** 35.27 to 36.68.

**Plankton-type.** Found throughout the whole Pacific. It was collected during the Challenger cruise at 37°—38° S. 44°—40° W., from 24° S. 14° W. to 11° N. 18° W. and at 1°—2° N. 28°—24° W. It has been found in soundings from 52° S. to 55° N. — *D.*

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## Chlorophyllaceæ.

### HALOSPHERA VIRIDIS SCHMITZ.<sup>1</sup>

(Mitth. zool. Stat. Neapel. Vol. I, 1877, pag. 67—92 Pl. III. *H. minor* Ostenf. and *H. vir. var. gracilis* Lemmermann not distinguished.)

1897 *December* and

1898 *January*: 9°—10° N. 26°—25° W.; area between 12° N. 50° W., 21° N. 43° W. and 25° N. 50° W.; Caribbean Sea; Bahamas; Azores to the Engl. Channel.

*February*: 26° N. 74° W. to 34° N. 73° W.; 50° N. 10° W.

*March*: 22° N. 43° W. to 33° N. 32° W.; Caribbean Sea; 28° N. 74° W.; 40° N. 68°—70° W.; 42° N. 51° W.; 45° N. 13° W.; 55° N. 12° W.

*April*: 10° N. 53° W.; Caribbean Sea; 34° N. 74° W.; 41° N. 19° W. to 48°—50° N. 8°—10° W.; 58° N. 2° W. to 61° N. 6° W.

*May*: 26° N. 42° W.; 32° N. 37° W.; 40° N. 68°—72° W.; 41° N. 54° W.; 50° N. 22° W.; 62° N. 2° E. to 59° N. 16° W.

*June*: area between Madeira, the Azores, 45° N. 26° W. and 46° N. 11° W.; N. Scotland.

*July*: Azores; 41° N. 58° W.

*August*: Azores; 40°—41° N. 59°—57° W.; area between 58° N. 7° W., 62° N. 10° W. and 61° N. 4° E.

*September*: Azores; mouth of the Engl. Channel; area between 56°—57° N. 12°—14° W., 59° N. 2° W., the Färöes and 60° N. 11° W.; N. of Iceland; 70° N. 21° E. to 73° N. 19° E.

*October*: 21° S. 36° W.; Azores; area between 56° N. 10°—12° W., 59° N. 16° W., the Färöes and 60° N. 3° W.

<sup>1</sup>Murray's & Whitting's and Ostensfeld's data used.

- November*: 26° S. 31° W.; 29° N. 43° W.; 22° N. 53° W. to 19° N. 58° W.; Azores; area between 42° N. 64° W., 53° N. 50° W. and 50° N. 20° W.; 63° N. 11° W. to 60° N. 1° W., round the Färöes.
- December*: 14° S. 36° W.; 25° N. 52° W.; 34° N. 38° W. to 36° N. 34° W.; Canaries; Azores; 47° N. 45° W. to 42° N. 63° W.; round the Färöes, thence to Scotland.
- 1899 *January*: 34° N. 9° W. to 33° N. 15° W.; 43° N. 57° W.; Färöes, common.
- February*: Färöes.
- March*: 35° N. 16° W.
- April*: 41° N. 16° W. to 50° N. 6° W.
- May*: 48° N. 45° W.; 57°—60° N. 2°—1° E.
- June*: 6°—19° S. 16°—1° W.; 69° N. 13° W.
- July*: 20° N. 34° W.; 40° N. 38° W. to 48° N. 25° W.
- August*: 60° N. 3° E.
- September*: 56° N. 17° W., common; 72° N. 19° E.; 67° N. 3° W. to 63° N. 1° E.
- October*: 52° N. 14° W., common; 52°—56° N. 21°—23° W., rare.
- November*: 51° N. 13°—21° W.; 49° N. 40° W.; 47° N. 51° W., nowhere common.

**Temperature**: 14.6, mean of 185 obs., max. 28, min. 4.6.

**Salinity**: 35.78, mean of 149 obs., max. 37.41, min. 31.96.

**Plankton type.** Occurs in the Mediterranean and the Indian Ocean. The principal area of distribution in the Atlantic is from the Cape Verde Islands to the Azores and thence, between 40°—50°, both west of Europe (March to October) and east of America (maximum in November—December). Another important area is near the Färöe Channel (August to February). *Halosphaera* was seen in September N. of Iceland and N. of Norway. — S. (1).

## Dinoflagellatæ.

AMPHIDOMA NUCULA STEIN.<sup>1</sup>

(D. Org. d. infusionth. Pl. IV fig. 21—24.)

- 1897 *December*: Caribbean Sea; 23°—25° N. 51°—50° W.  
 1898 *January*: Azores.  
*February*: 34°—32° N. 31°—34° W.; 28°—27° N. 39°—41° W.;  
 Caribbean Sea.  
*March*: 42° N. 22° W.; 30° N. 45° W.  
*May*: 43°—44° N. 23°—20° W.; 31° N. 43° W.; 16° N. 54°—  
 58° W.; Caribbean Sea.

**Temperature:** 23, mean of 25 obs., max. 27.7, min. 15.6.

Plankton-type: *D.*

**AMPHISOLENIA PALMATA** STEIN.<sup>2</sup>

(D. Org. d. infus. Pl. XXI fig. 11—15.)

- 1897 *December*: 32° N. 32° W.; 23° N. 48° W.  
 1898 *January*: Azores to 24° N. 40° W.; 32° N. 74° W.  
*February*: 31° N. 35° W. to 25° N. 44° W.; Caribbean Sea;  
 30°—34° N. 74°—73° W.; 5° S. 0° W.  
*March*: 4° S. 10° W.; 11° N. 19° W. to 18° N. 25° W.; area  
 between 39° N. 32° W., 29° N. 45° W., 15° N. 49° W. and  
 37° N. 24° W.; Caribbean Sea.

<sup>1</sup> Murray's & Whitting's data only.

2       »       »       »       »       used.

- April*: 29° N. 38° W. to 16° N. 56° W. and 12° N. 51° W.; Caribbean Sea.  
*May*: 28° N. 45°—47° W.; 16°—20° N. 58°—54° W.; Caribbean Sea; 41° N. 51° W.  
*July*: Caribbean Sea; 40° N. 67° W.  
*August*: 30° N. 74° W.; 40° N. 67° W.; 42° N. 50° W.  
*November*: 19° S. 31° W.; 4° N. 30° W.; 13° N. 27° W.; Azores; 36° N. 14° W.  
*December*: Canaries; Azores to 34° N. 41° W.; 22° N. 56° W.  
 1899 *January*: Canaries to Gibraltar.  
*February*: 32° N. 46° W.  
*June*: 19° S. 1° W.

**Temperature**: 24.45, mean of 65 obs., max. 28.2, min. 16.4.

**Salinity**: 36.22, mean of 34 obs., max. 37.87, min. 33.20.

**Plankton-type**: Occurs in the Red Sea, Indian Ocean and Pacific. It belongs to the tropical Atlantic. It occurs in the Sargasso Sea (December to June), in the Caribbean Sea and the Florida current, in August to 42° N., and in December between the Azores and the Canaries. — *D.*

### AMPHISOLENIA THRINAX SCHÜTT.<sup>1</sup>

(Pflanzenleben der Hochsee pag. 271 fig. 81.)

- 1898 *January*: 32° N. 74° W.  
*February*: 13°—15° N. 70°—71° W.; 27°—25° N. 41°—44° W.  
*March*: 14° N. 50° W.; 29°—31° N. 45°—42° W.  
*September*: 40° N. 65° W.  
*October*: 21° S. 36° W.  
*December*: 30° N. 16° W.

**Temperature**: 22.5, mean of 8 obs., max. 27, min. 19.1.

**Salinity**: 36.11, mean of 4 obs., max. 37.31, min. 35.51.

**Plankton-type**. Found in the Pacific and Indian Ocean. It rarely occurs in the tropical Atlantic, east and west, the Sargasso Sea, the Caribbean Sea and the Florida current, where, in September, it reaches 40° N. — *D.*

<sup>1</sup> Murray's & Whitting's data used.



**CERATIUM ARCTICUM (EHB.).<sup>1</sup>**

(EHB. Microg. Pl. XXXV A fig. A. *C. tripos* var. *labradorica* Schütt Pflanzenleb. der Hochsee pag. 308. *Cer. labradoricum* Vanhöffen Grönl. Exp. II Pl. V fig. 8. *C. tripos* v. *arctica* CL. Fifteenth annual report of the Fishery Board for Scotland, for 1896, fig. 3.)

1898 *February*: 50° N. 10° W.; 45° N. 50° W.

*March*: 71° N. 2° W.; 63° N. 1° 30' E.; 68° N. 26° W.; 40°—42° N. 72°—42° W.

*April*: 74°—75° N. 4°—9° W.; 43° N. 51° W. to 42° N. 61° W.

*May*: 71° N. 16° W. to 78° N. 2° 30' W.; 48° N. 33° W.; 45° N. 41° W.; 45° N. 45° W. to 40° N. 72° W.; 41° N. 52° W.

*June*: 69° N. 54° W.; 45° N. 41° W., common; 41° N. 59° W., common; 73° N. 22° E., rare; 77° N. 27° E., rare; 62° N. 2° 30' E., rare.

*July*: 67° N. 21°—22° W., rare; 64° N. 3° W., very abundant; 42° N. 48° W.; 36° N. 28° W. (Azores) very rare; 64° N. 3° E., very rare; Spitzbergen, 78° N. 0°—7° 30' E., rare.

*August*: 66° N. 18° W.; 65° N. 12° W., common; 63° N. 7° W., common; 66° N. 55° W. to 69° N. 53° W.; 42° N. 48° W. to 52° N. 55° W., very common; round Spitzbergen, common to rare.

*September*: between Spitzbergen and Beeren Island; 60° N. 55° W. to 69° N. 53° W., very common; 53° N. 50° W., rare.

*October*: Davis's Strait; 53° N. 52° W. to 46° N. 47° W., very common.

*November*: area between 42° N. 64° W., 53° N. 50° W., 54° N. 25° W. and 49° N. 23° W. (very common between 47° N. 41° W., 45° N. 50° W. and 48° N. 49° W., outside this area decreasing in frequency); 50° N. 9° W., rare and dead; 34° N. 10° W., one specimen only.

*December*: 47° N. 45° W., very common; 42° N. 49° W., very common; 45° N. 53° W., not rare; 42° N. 63° W., rare.

1899 *January*: 49° N. 20° W., not rare; 49° N. 30° W., common; 48° N. 39° W., dead specimens common; 45° N. 49° W., very common; 43° N. 57° W., very common.

<sup>1</sup> Ostenfeld's data for *C. tripos* v. *labradorica* used.

*March*: 65° N. 13° W., rare.

*May*: 38° N. 74° W. to 50° N. 39° W., very common between 45° and 57° N.; 75° N. 2° E., rare.

*June*: 66°—69° N. 3°—13° W., not common; 62° N. 1° E. to 65° N. 1° W. (rare in deep sea hauls from 200—0 metres); 72° N. 18° E. to 75° N. 16° E., rare.

*July*: 79° N. 10° E., very rare; 71° N. 32° E. to 79° N. 53° E. (common at 73°—75° N. 41°—48° E.); 51° N. 47° W. to 52° N. 54° W., common.

*August*: 71° N. 20° W. to 73° N. 24° W., usually rare, but common at 71° N. 23° W.; 80° N. 51° E., rare; 78° N. 47° E., common, thence rarer to 74° N. 31° E., 56° N. 31° W., 54° N. 46° W., rare; 52° N. 53° W., very abundant.

*September*: 71° N. 15° W., rare, to 68° N. 8° W., common; 67° N. 4° W., rare, 79° N. 11° E. to 75° N. 17° E., more or less rare; 56° N. 33° W., rare; 52°—53° N. 55°—52° W., very abundant.

*October*: 56° N. 38° W., rare.

*November*: 53° N. 48° W., rare.

**Temperature**: 8.3, mean of 36 obs., max. 22, min. 0.<sup>1</sup>

**Salinity**: 33.64, mean of 36 obs., max. 36.33, min. 30.98.

**Plankton-type**. This species is a very characteristic arctic form, which, to judge from the low mean salinity, belongs to the coast regions of Spitzbergen, Greenland and the Newfoundland Banks, whence it spreads by under currents across the ocean towards Europe. It occurs in the northern Pacific (Lemmermann). — *Nj* (*T*).

### CERATIUM TRIPOS VAR. ARCUATA GOURRET.

(Ann. Musée d'hist. nat. de Marseille. Zool. Vol. I 1883 n. 8 pag. 25 Pl. II fig. 42.)

1898 *March*: 6° S. 4° W.; 3° N. 16° W.

*June*: 23° N. 42° W.; 29° N. 36° W.; Azores to Madeira.

*July*: Caribbean Sea; 21° N. 58° W.; 29° N. 74° W.; area between 41° N. 60° W., 44° N. 40° W., the Azores and 31° N. 39° W.

<sup>1</sup> Only such samples as contained this species in abundance have been considered.

- August*: Bahamas; 34° N. 73° W.; 40° N. 66° W. to 46° N. 33° W.; Azores; 50° N. 12° W., rare.
- September*: 8° N. 25° W. to Cape Verde Islands; 38° N. 74° W.; 42° N. 57° W.; 47° N. 33° W. to 48° N. 29° W.; 46° N. 11° W.; Azores; 33° N. 31° W.
- October*: 21° S. 36° W.; Caribbean Sea; Bahamas to 38° N. 74° W.; 41° N. 59° W.; Azores.
- November*: Rio Janeiro; 26°—24° S. 30°—29° W.; 22° N. 53° W.; 26° N. 48° W.; 56° N. 36° W., common; area between 36° N. 14° W., 34° N. 10° W. and 29° N. 19° W.; 13° N. 26° W.; 8° N. 28° W.
- December*: 29°—26° S. 49°—45° W.; Porto Rico; 22° N. 56° W.; 25° N. 52° W.; 34° N. 38° W.; Azores; Canaries; Gibraltar.
- 1899 *January*: 32° N. 16° W.
- March*: 35° N. 16° W.; 18° N. 45° W.
- April*: 41° N. 17° W.; 28° and 36° N. 74° W.
- May*: 35° N. 75° W.
- June*: 19° S. 1° W.; 6° S. 16° W.; 7° N. 25° W.; 15° N. 50° W.
- July*: 11° N. 26° W.; 35° N. 40° W. to 45° N. 31° W.
- Temperature**: 23<sub>1</sub>, mean of 94 obs.; max. 28.<sub>2</sub>, min. 7.<sub>8</sub>.
- Salinity**: 35.<sub>55</sub>, mean of 87 obs., max. 37.<sub>41</sub>, min. 32.<sub>84</sub>.
- Plankton-type**: *D*.

### CERATIUM (TRIPOS VAR.) ARIETINUM CL.

(Kongl. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. VII fig. 3.)

- 1897 *December*: 40° N. 22° W.; 41° N. 18° W.
- 1898 *January*: 14° N. 51° W.; 7° N. 53° W.
- February*: 34° N. 74° W.
- March*: Azores to 45° N. 13° W.
- April*: 39° N. 24° W.; 48° N. 8° W.
- May*: area between 40° N. 16° W., 50° N. 14° W. and 42° N. 61° W.
- June*: 10° N. 52° W.; 22° N. 60° W.; 40° N. 10° W.; 50° N. 12° W.; 48° N. 33° W.
- August*: Caribbean Sea; Azores.
- September, October*: Azores.

*November:* 4° N. 28° W.; 29° N. 43° W.; 45° N. 36° W.; Azores.

*December:* Azores.

1899 *January:* 33°—36° N. 15°—9° W.

*February:* 32° N. 47° W.

*March:* Azores to the Engl. Channel.

*April:* area between 40° N. 15°—16° W.; 46° N. 13° W. and 42° N. 18° W.

*June:* 15° N. 50° W., rare.

*August and September:* 56° N. 23° W., very rare.

*October:* 53° N. 25°—31° W. to 56° N. 31° W., rare.

*November:* 51° N. 13° and 34° W., rare.

**Temperature:** 19, mean of 55 obs., max. 27.2, min. 9.8.

**Salinity:** 35.85, mean of 41 obs., max. 37.05, min. 32.96.

**Plankton-type.** This form occurs in the Indian Ocean. Its principal area of distribution in the Atlantic is the eastern; temperate part. Nevertheless it has been found, although rarely, in the Equatorial Current, Caribbean Sea and the Antilles Current. In March and April it occurs from the Azores towards the Engl. Channel, but in May it spreads across the whole Atlantic, between 40° and 50° N., but later in the year it has been found there only rarely. — S.

### CERATIUM (TRIPOS VAR.) AZORICUM CL.

(Kongl. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. VII fig. 6, 7.)

1898 *April:* Azores.

1899 *January:* 34° N. 12° W.

*March:* 36°—37° N. 29°—26° W.; 46° N. 11° W.

*April:* 40° N. 16°—18° W. to 44° N. 15° W.

*May:* 25° S. 7° E.

**Temperature:** 12°—19°

**Salinity:** 35.70 to 36.88.

**Plankton-type:** S

## CERATIUM BELONE CL.

(K. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. VII fig. 13.)

1898 *April*: 10° N. 53° W.1899 *January*: 33°—34° N. 15°—12° W.**Temperature**: 17.<sub>s</sub> to 22.**Salinity**: 36.<sub>34</sub> to 36.<sub>61</sub>.**Plankton-type**: *D*.

## CERATIUM (TRIPOS VAR.) BUCEPHALUM CL.

(Fifteenth annual report of the Fishery Board for Scotland, for 1896, pag. 302 fig. 5.

*C. arcuatum* Vanhöffen Grönl. Exp. II Pl. V fig. 13.)1898 *January*: 14° N. 70° W*February*: 34° N. 73° W.*March*: 7° N. 17°—21° W.; Canaries; 44° N. 17° W.; 48° N. 6° W.; 41° N. 60° W.*April*: 41° N. 19° W.; 48° N. 8° W.; 39° N. 74° W.*May*: 46° N. 38° W. to 48° N. 26° W. (common); 61° N. 20° W., very rare (Ostenfeld); 40° N. 72°—68° W.*June*: Azores; 44° N. 9° W.*September*: 38° N. 74° W.; 71°—76° N. 15°—19° E. (AURIV.)*November*: 41° N. 69°—66° W.*December*: 41° N. 66° W.1899 *January*: 40°—41° N. 66°—69° W.*March*: 44° N. 16° W.; 46° N. 11° W.*May*: 50° N. 33°—39° W.; 57° N. 2° 41' E.; 35°—38° N. 75°—74° W.*June*: 15° N. 49° W.; 62° N. 2° E.*August*: 72° N. 26° E.*September*: 56° N. 38° W., rare.**Temperature**: 15.<sub>3</sub>, mean of 34 obs., max. 27.<sub>s</sub>, min. 6.**Salinity**: *a*. Western Atlantic: 33.<sub>90</sub>, mean of 12 obs., max. 36.<sub>40</sub>, min. 32.<sub>20</sub>; *b*. Eastern Atlantic: 35.<sub>60</sub>, mean of 14 obs., max. 36.<sub>25</sub>, min. 34.<sub>83</sub>.**Plankton-type**. This principal area of distribution is between the Azores and, along 50° N., from the Engl. Channel to 40° W.,

but also along the N. American coast, from New York to  $41^{\circ}$  N.  $60^{\circ}$  W. In May and June it crosses the Färöe Channel and enters the North Sea. Rare specimens may drift to the north of Norway and to Beeren Island. S.

### CERATIUM CANDELABRUM EHB.<sup>1</sup>

(STEIN D. Org. d. Infus. Pl. XV fig. 15—16.)

- 1897 *December*:  $43^{\circ}$  N.  $18^{\circ}$  W.;  $12^{\circ}$ — $25^{\circ}$  N.  $50^{\circ}$ — $51^{\circ}$  W.; Caribbean Sea.
- 1898 *January*:  $7^{\circ}$  N.  $53^{\circ}$  W. to  $21^{\circ}$  N.  $43^{\circ}$  W.; Caribbean Sea; Bahamas; Florida Current to  $35^{\circ}$  N.  $74^{\circ}$  W.; Azores.
- February*:  $28^{\circ}$  N.  $39^{\circ}$  W.;  $21^{\circ}$  N.  $50^{\circ}$  W. to  $14^{\circ}$  N.  $79^{\circ}$  W.; Bahamas; Florida Current to  $34^{\circ}$  N.  $73^{\circ}$  W.; Gulf of Guinea,  $5^{\circ}$  S.  $8^{\circ}$  E.; Canaries.
- March*:  $4^{\circ}$  S.  $10^{\circ}$  W.; Canaries; Azores;  $12^{\circ}$  N.  $51^{\circ}$  W. to  $30^{\circ}$  N.  $35^{\circ}$ — $45^{\circ}$  W.; Caribbean Sea.
- April*: area between  $7^{\circ}$  N.  $55^{\circ}$  W.,  $32^{\circ}$  N.  $34^{\circ}$  W. and  $16^{\circ}$  N.  $56^{\circ}$  W.; Caribbean Sea;  $31^{\circ}$  N.  $75^{\circ}$  W.
- May*: area between  $34^{\circ}$  N.  $40^{\circ}$  W.,  $27^{\circ}$  N.  $48^{\circ}$  W. and  $29^{\circ}$  N.  $39^{\circ}$  W.;  $16^{\circ}$  N.  $54^{\circ}$ — $58^{\circ}$  W.; area between  $49^{\circ}$  N.  $23^{\circ}$  W.,  $43^{\circ}$  N.  $45^{\circ}$  W. and  $41^{\circ}$  N.  $64^{\circ}$  W.
- June*:  $24^{\circ}$  N.  $58^{\circ}$  W. to  $33^{\circ}$  N.  $48^{\circ}$  W.;  $42^{\circ}$  N.  $50^{\circ}$  W.;  $48^{\circ}$  N.  $31^{\circ}$  W.
- July*:  $26^{\circ}$  N.  $48^{\circ}$  W.; Caribbean Sea; Bahamas;  $40^{\circ}$ — $41^{\circ}$  N.  $69^{\circ}$ — $58^{\circ}$  W.
- August*: Caribbean Sea; Bahamas; Florida Current to  $25^{\circ}$  N.  $74^{\circ}$  W.; area between  $38^{\circ}$  N.  $74^{\circ}$  W.,  $44^{\circ}$  N.  $42^{\circ}$  W. and  $40^{\circ}$  N.  $48^{\circ}$  W.;  $49^{\circ}$  N.  $20^{\circ}$  W.
- September*: Caribbean Sea; Bahamas;  $41^{\circ}$  N.  $65^{\circ}$  W. to  $43^{\circ}$  N.  $48^{\circ}$  W.;  $8^{\circ}$ — $12^{\circ}$  N.  $25^{\circ}$ — $27^{\circ}$  W.; Madeira.
- October*:  $38^{\circ}$  N.  $73^{\circ}$  W.;  $21^{\circ}$  S.  $36^{\circ}$  W.
- November*:  $40^{\circ}$ — $42^{\circ}$  N.  $67^{\circ}$ — $64^{\circ}$  W.;  $0^{\circ}$  S.  $30^{\circ}$  W. to  $9^{\circ}$  S.  $34^{\circ}$  W.;  $18^{\circ}$  S.  $31^{\circ}$  W. to  $26^{\circ}$  S.  $30^{\circ}$  W.; Rio Janeiro.
- December*: Canaries; off Gibraltar;  $25^{\circ}$  N.  $52^{\circ}$  W.; Caribbean Sea.
- 1899 *January*:  $29^{\circ}$  N.  $16^{\circ}$  W. to  $34^{\circ}$  N.  $12^{\circ}$  W.

<sup>1</sup> Murray's & Whitting's data used.

*March*: 35° N. 16° W.

*April*: 28°—36° N. 75°—74° W.

*June*: 27° N. 39° W.; 21° N. 45° W.; 20° S. 1° E. to 10° S. 11° W.

*July*: 11°—12° N. 26°—27° W.; 20° N. 34° W.; 45° N. 31° W.

*October*: 56° N. 23° W.

**Temperature**: 22.4, mean of 103 obs., max. 28.4, min. 9.

**Salinity**: 35.69, mean of 78 obs., max. 38.18, min. 32.84.

**Plankton-type.** This species is noted from the Mediterranean and Indian ocean. It occurs in the tropical Atlantic between 35° S. and 50° N., more abundantly in the western than the eastern parts, in the Sargasso Sea from December to June, in the west, between 40° and 50° N., from May to September, rarely later, from the Mediterranean to the Canaries in the winter. — *D.*

### CERATIUM CONTORTUM GOURRET.

*C. gibberum* var. cont. Ann. du Musée d'Hist. nat. de Marseille Zool. Vol. I n. 8. 1883 Pl. II fig. 33. — SCHÜTT Pflanzenleben d. Hochsee pag. 268. VII b. no name.)

1898 *January*: 23° N. 42° W. to 11° N. 52° W.; Caribbean Sea; Bahamas.

*February*: Caribbean Sea; Bahamas.

*March*: 10° N. 20° W.; area between 23° N. 28° W., 25° N. 41° W. and 9°—10° N. 53°—59° W.

*April*: 12°—7° N. 51°—55° W.; 31° N. 75° W.

*May*: 21° N. 48° W. to 11° N. 52° W.; Caribbean Sea.

*June*: area between 36° N. 44° W., 16° N. 48° W. and 22° N. 60° W.

*July*: 33° N. 74° W. to 38° N. 74° W., thence to 41° N. 58° W.

*August*: 34° N. 73° W.; 40° N. 67° W. to 44° N. 42° W., common.

*September*: 15° N. 49° W. to 9° N. 53° W.; 20°—33° N. 74° W.; 41° N. 65° W.; 42° N. 57° W.

*October*: 38° N. 74° W.

*November*: 26°—18° S. 30°—31° W.; S. of Cape Verde Islands; 26° N. 48° W.

*December*: 26° S. 45° W.; 22° N. 55° W.

1899 *April*: 32°—36° N. 75°—74° W.

*June*: 7°—9° S. 14°—12° W.; 15° N. 44° W.

*July*: 11° N. 26° W.

**Temperature**: 25.6, mean of 68 obs., max. 28.3, min 17.5.

**Salinity**: 35.69, mean of 51 obs., max. 37.43, min. 32.96.

**Plankton-type**. Found in the Mediterranean, Indian and Pacific. It occurs in the southern hemisphere both W. of Africa and E. of S. America. In the northern hemisphere it is confined to the western part, or W. of a line drawn from the Cape Verde Islands to the Newfoundland Banks. It occurs in the Sargasso Sea chiefly from winter to June. In July to September (maximum in August) it occurs between 40° and 45° N. — *D.*

### CERATIUM CURVICORNE v. DAD.

*C. trip. var. curvicornis* v. DAD. Termesztetrajzi füzetek, a Mus. nat. hung. Budapest vulgata 1887—88 Pl. III fig. 4, 8, 12, 14, 17. — SCHÜTT Pflanzenleben d. Hochsee pag. 268. Fig. VII a, without name.)

1897 *December*: 39° N. 24° W. to 32° N. 33° W.; 12° N. 50° W.

1898 *January*: 0°—1° S. 26°—27° W.; 29°—35° N. 74° W.

*February*: 5° S. 4° E.; Caribbean Sea; Bahamas.

*March*: area between 1° S. 27° W., 3° N. 16° W. and 11° N. 20° W.; Azores to 23° N. 42° W.; 12° N. 50° W.; 37° N. 74° W.

*April*: 7° N. 55° W.; Caribbean Sea; 27°—34° N. 74° W.

*May*: 21° N. 48° W. to 28°—29° N. 47°—39° W.; 45° N. 43° W.

*June*: 29° N. 36° W.

*July*: 29° N. 44° W.; 33° N. 74° W.; 40° N. 67° W. to 42° N. 48° W.

*August*: 22° N. 74° W. to 30° N. 74° W.; 40° N. 66° W. to 45° N. 43° W. and 44° N. 42° W.

*September*: 8°—18° N. 25° W.; Caribbean Sea; 41° N. 65° W. to 42° N. 57° W.

*October*: Bahamas; 34° N. 74° W.

*November*: 18°—19° S. 30°—31° W.; 0° S. 31° W. to 13° N. 27° W.

*December*: 14° S. 36° W.; 26° S. 45° W.; 34° N. 38° W. to 19° N. 58° W.; Porto Rico; Canaries; Gibraltar; Azores.



1899 *January*: Canaries to 33° N. 15° W.

*February*: 32° N. 47° W.

*March*: 21° N. 43° W.

*April*: 28°—36° N. 74°—75° W.

*June*: 19° S. 1° W.; 3° S. 20° W. to 7° S. 14° W.; 9° N. 25° W.; 21° N. 45° W.

*July*: 28° N. 40° W.; 40° N. 38° W.

**Temperature**: 21.4, mean of 101 obs., max. 28.4, min. 9.8.

**Salinity**: 35.77, mean of 71 obs., max. 37.40, min. 33.20.

**Plankton-type.** Occurs in the Mediterranean, the Red Sea and Indian Ocean, in the Atlantic in the S. Equatorial and Brazil Currents. It follows the Equatorial Current along the N. coast of S. America into the Caribbean Sea, thence the Antilles and Florida Currents to the south of the Newfoundland Banks, between 40° and 45° N., where it occurs abundantly from July to September, thence, in the winter, to the space between the Azores, Gibraltar and the Canaries. It occurs in the Sargasso Sea not rarely from December to May, more rarely later. — *D.*

### CERATIUM DIGITATUM SCHÜTT.

(*D. Peridinéen* d. Plankton-exp. Pl. XII fig. 42.)

1898 *February*: Caribbean Sea.

*March*: 7° N. 55° W.

*April*: Caribbean Sea.

**Temperature**: 24.8, mean of 4 obs., max. 26.65, min. 20.7.

### CERATIUM (FUSUS VAR.) EXTENSUM GOURRET.

(*Ceratium fusus* SCHÜTT Pl. d. Hochsee pag. 271 fig. 80. *C. fusus var. extensum* GOURRET Ann. du Musée d'hist. nat. de Marseille, zool. Vol. I n. 8 pag. 52 Pl. IV fig. 56. *C. fusus var. longiseta* CL. K. Sv. Vet. Akad. Handl. Vol. XXXII n. 3. pag. 3, nomen nudum.)

1898 *January*: 1° S. 26°—27° W.; 11° N. 52° W.; 18° N. 46° W. to 45° N. 13° W.; Caribbean Sea; 26°—32° N. 74° W.; 7°—8° N. 22°—21° W.; 44°—46° N. 17°—11° W.

*February*: 5° S. 9° E.; 16° N. 71° W. to 30° N. 74° W.

- March*:  $4^{\circ}$ — $1^{\circ}$  S.  $10^{\circ}$ — $15^{\circ}$  W.;  $11^{\circ}$ — $18^{\circ}$  N.  $19^{\circ}$ — $25^{\circ}$  W.;  $15^{\circ}$  N.  $49^{\circ}$  W. to  $43^{\circ}$  N.  $17^{\circ}$  W.; Caribbean Sea;  $32^{\circ}$  N.  $74^{\circ}$  W.;  $40^{\circ}$  N.  $56^{\circ}$  W.;  $45^{\circ}$  N.  $36^{\circ}$  W.;  $49^{\circ}$  N.  $18^{\circ}$  W.
- April*:  $41^{\circ}$  N.  $19^{\circ}$  W.;  $48^{\circ}$  N.  $29^{\circ}$  W.;  $15^{\circ}$  N.  $49^{\circ}$  W.; Caribbean Sea;  $31^{\circ}$  N.  $75^{\circ}$  W.
- May*: Azores; area between  $46^{\circ}$  N.  $31^{\circ}$ — $35^{\circ}$  W. and  $48^{\circ}$  N.  $30^{\circ}$ — $26^{\circ}$  W.;  $23^{\circ}$  N.  $45^{\circ}$ — $46^{\circ}$  W.;  $26^{\circ}$  N.  $52^{\circ}$  W.
- June*:  $22^{\circ}$  N.  $60^{\circ}$  W. to  $33^{\circ}$  N.  $48^{\circ}$  W.
- July*:  $24^{\circ}$  N.  $54^{\circ}$  W.; Caribbean Sea;  $25^{\circ}$  and  $38^{\circ}$  N.  $74^{\circ}$  W.;  $41^{\circ}$  N.  $60^{\circ}$  W.;  $34^{\circ}$ — $31^{\circ}$  N.  $33^{\circ}$ — $39^{\circ}$  W.
- August*:  $22^{\circ}$  N.  $74^{\circ}$  W. to  $34^{\circ}$  N.  $73^{\circ}$  W.;  $42^{\circ}$  N.  $62^{\circ}$  W.;  $47^{\circ}$  N.  $39^{\circ}$  W.;  $49^{\circ}$  N.  $20^{\circ}$  W. to  $50^{\circ}$  N.  $12^{\circ}$  W.; Azores.
- September*:  $9^{\circ}$  N.  $53^{\circ}$  W.; Caribbean Sea;  $20^{\circ}$ — $28^{\circ}$  N.  $74^{\circ}$  W.;  $46^{\circ}$  N.  $11^{\circ}$  W.; Azores.
- October*: Caribbean Sea;  $30^{\circ}$  N.  $74^{\circ}$  W.; Azores.
- November*:  $8^{\circ}$  N.  $28^{\circ}$  W.;  $13^{\circ}$  N.  $27^{\circ}$  W.; Azores.
- December*:  $29^{\circ}$ — $30^{\circ}$  N.  $14^{\circ}$ — $16^{\circ}$  W.; Azores.
- 1899 *January*:  $33^{\circ}$  N.  $15^{\circ}$  W. to  $35^{\circ}$  N.  $9^{\circ}$  W.
- March*: Azores.
- April*:  $41^{\circ}$ — $44^{\circ}$  N.  $18^{\circ}$ — $15^{\circ}$  W.
- June*:  $19^{\circ}$  S.  $1^{\circ}$  E. to  $14^{\circ}$  S.  $7^{\circ}$  E.;  $15^{\circ}$  N.  $49^{\circ}$  W.;  $24^{\circ}$  N.  $42^{\circ}$  W.
- July*:  $35^{\circ}$  N.  $40^{\circ}$  W.;  $48^{\circ}$  N.  $25^{\circ}$  W.
- August*:  $48^{\circ}$  N.  $13^{\circ}$ — $17^{\circ}$  W.

**Temperature:**  $21.4$ , mean of 121 obs., max.  $28.4$ , min.  $8$ .

**Salinity:**  $36.01$ , mean of 80 obs., max.  $37.63$ , min.  $33.92$ .

**Plankton-type.** Found in the Mediterranean and the Pacific.

In the Atlantic it follows the south Equatorial Current to the north of South America, enters the Caribbean Sea, the Florida Current and the Sargasso Sea. In May and August it occurs between  $45^{\circ}$  and  $50^{\circ}$  N., which seems to be the northern limit. It occurs during the whole year at the Azores. — *D. (S.)*

## CERATIUM FLAGELLIFERUM CL.

(*C. trip. var. flagellifera* CL. K. Sv. Vet. Akad. Handl. Vol. XXXII n. 3 1899 pag. 1, nomen nudum. — SCHÜTT Pflanzenl. d. Hochsee pag. 267 fig. 77 V. b. (no name). — *C. trip. var. inflexum* GOURRET Ann. du Musée d'hist. nat. de Marseille, zool., Vol. I n. 8 pag. 29 Pl. III fig. 44?)

1897 *December* and

1898 *January*: 16° S. 37° W. to 8° S. 31° W.; 7°—11° N. 22°—20° W.; 7°—12° N. 53°—50° W.; 25°—35° N. 74° W.; 41° N. 22° W.; 27° N. 37° W. to 18° N. 46° W.

*February*: 5° S. 4°—9° E.; Caribbean Sea; 21°—30° N. 74° W.

*March*: 6° S. 4° W.; 7°—11° N. 17°—19° W.; area between 23° N. 28° W., the Azores and 9° N. 59° W.; 28°—32° N. 74° W.

*April*: 10° N. 52°—53° W.; 12° N. 51° W.; Caribbean Sea; 31° N. 75° W.

*May*: area between 11° N. 52° W., 32° N. 36° W. and 23° N. 56° W.; 41° N. 51° W.; Azores.

*June*: 10° N. 55° W.; area between 24° N. 58° W., 40° N. 37° W., 30° N. 36° W. and 23° N. 42° W.; Madeira.

*July*: 34° N. 33° W.; Azores; Caribbean Sea; 25°—38° N. 74° W.; 42° N. 48° W.

*August*: 40° N. 66° W. to 45° N. 40° W.; Azores.

*September*: 17° N. 48° W.; 20°—25° N. 74° W.; 41° N. 65° W.; 42° N. 57° W.; Azores; Madeira.

*October*: 21° S. 36° W.; 30°—34° N. 74° W.; Azores.

*November*: 18°—19° S. 31° W.; 34°—36° N. 10°—14° W.; Azores; 42° N. 64° W.

*December*: 29°—14° S. 49°—36° W.; area between the Canaries, Gibraltar, the Azores and 34° N. 38° W.; Porto Rico.

1899 *January*: 29° N. 16° W. to 33° N. 15° W. and 35° N. 9° W.

*February*: 32°—34° N. 47°—40° W.

*March*: Azores; 18° N. 45° W.

*April*: 9° N. 59° W.; 32°—36° N. 75°—74° W.

*June*: 19°—20° S. 1° E.; 15° N. 49° W.

*July*: 11° N. 26° W.; 20° N. 34° W.; 29° N. 41° W.

**Temperature**: 22.9, mean of 139 obs., max. 28.3, min. 15.5.

**Salinity**: 36.00, mean of 96 obs., max. 37.41, min. 28.10.

**Plankton-type.** The area of distribution is the whole tropical and subtropical Atlantic, between Africa and South America. It has been seen in 1898 May and July only very rarely north of  $40^{\circ}$  N., but in August it passed beyond that limit to at least  $45^{\circ}$  N. In September to January it occurred between the Azores, Gibraltar and the Canaries. — *D.*

### CERATIUM FURCA DUJ.<sup>1</sup>

(STEIN: D. Org. d. Infusionsth. Pl. XV fi 7—14.)

1897 *December* and

1898 *January*:  $12^{\circ}$ — $21^{\circ}$  N.  $19^{\circ}$ — $17^{\circ}$  W.;  $4^{\circ}$  N.  $30^{\circ}$  W. to  $13^{\circ}$  S.  $35^{\circ}$  W.; Caribbean Sea;  $25^{\circ}$  N.  $50^{\circ}$  W.

*February*:  $21^{\circ}$ — $27^{\circ}$  N.  $41^{\circ}$ — $51^{\circ}$  W.; Caribbean Sea.

*March*:  $4^{\circ}$  S.  $10^{\circ}$  W.;  $3^{\circ}$  N.  $16^{\circ}$  W.;  $14^{\circ}$ — $25^{\circ}$  N.  $17^{\circ}$ — $18^{\circ}$  W.;  $29^{\circ}$  N.  $42^{\circ}$  W.;  $7^{\circ}$  N.  $55^{\circ}$  W.; Caribbean Sea.

*April*:  $39^{\circ}$  N.  $24^{\circ}$  W.;  $59^{\circ}$  N.  $22^{\circ}$  W.; north of Scotland.

*May*:  $16^{\circ}$ — $24^{\circ}$  N.  $58^{\circ}$ — $51^{\circ}$  W.; area between  $44^{\circ}$  N.  $19^{\circ}$  W.,  $48^{\circ}$  N.  $29^{\circ}$  W. and  $50^{\circ}$  N.  $12^{\circ}$  W.;  $59^{\circ}$ — $57^{\circ}$  N.  $28^{\circ}$ — $25^{\circ}$  W. to the Färöe Channel; Shetlands to  $58^{\circ}$  N.  $5^{\circ}$  E. and  $66^{\circ}$  N.  $9^{\circ}$  E.

*June*:  $34^{\circ}$  N.  $46^{\circ}$  W. and  $57^{\circ}$  N.  $34^{\circ}$  W., rare; area between  $40^{\circ}$  N.  $10^{\circ}$  W.,  $42^{\circ}$  N.  $33^{\circ}$  W. and  $47^{\circ}$  N.  $17^{\circ}$  W., maximum at  $45^{\circ}$  N.  $23^{\circ}$  W.; N. of Scotland (common on some spots) to SE. Iceland to the west coast of Norway, from  $61^{\circ}$  to  $68^{\circ}$  N.

*July*: common at  $39^{\circ}$  N.  $23^{\circ}$  W., more or less rare at  $49^{\circ}$  N.  $22^{\circ}$ — $10^{\circ}$  W.; common on the area between the Färöes, Scotland and the Shetlands, thence less common to  $58^{\circ}$  N.  $32^{\circ}$  W. and sparingly to  $59^{\circ}$  N.  $2^{\circ}$  E.

*August*:  $49^{\circ}$  N.  $24^{\circ}$ — $12^{\circ}$  W.;  $56^{\circ}$  N.  $34^{\circ}$ — $28^{\circ}$  W.;  $40^{\circ}$ — $41^{\circ}$  N.  $59^{\circ}$  W.; Irish Sea and the Clyde area; common from the Shetlands to the Färöes and thence with decreasing abundance to Iceland and round that island;  $60^{\circ}$  N.  $3^{\circ}$  E., rare.

*September*:  $45^{\circ}$ — $49^{\circ}$  N.  $14^{\circ}$  W. to  $49^{\circ}$  N.  $3^{\circ}$  W.; SW. and N. of Rockall,  $56^{\circ}$  N.  $19^{\circ}$  W. and  $57^{\circ}$  N.  $14^{\circ}$  W.; common N.

<sup>1</sup> Ostenfeld's, Murray's & Whitting's data used.

of Iceland,  $66^{\circ}$  N.  $18^{\circ}$  W.;  $64^{\circ}$  N.  $31^{\circ}$  W. to the south of the Shetlands. — N. of Norway,  $70^{\circ}$  N.  $21^{\circ}$  E. to  $73^{\circ}$  N.  $19^{\circ}$  E.

*October*:  $50^{\circ}$  N.  $10^{\circ}$  W.;  $58^{\circ}$  N.  $32^{\circ}$  W. to  $59^{\circ}$  N.  $3^{\circ}$  W., maximum in the Färöe Channel; S. of Iceland, rare.

*November*:  $5^{\circ}$  S.  $33^{\circ}$  W.;  $17^{\circ}$  N.  $25^{\circ}$  W. to  $20^{\circ}$  N.  $23^{\circ}$  W.;  $49^{\circ}$  N.  $12^{\circ}$  W.;  $56^{\circ}$  N.  $23^{\circ}$ — $30^{\circ}$  W.; Iceland to the Shetlands, rare.

*December*:  $29^{\circ}$  S.  $49^{\circ}$  W. to  $22^{\circ}$  S.  $41^{\circ}$  W.;  $18^{\circ}$  N.  $67^{\circ}$  W.;  $50^{\circ}$  N.  $9^{\circ}$  W., rare; Färöes rare;  $43^{\circ}$  N.  $58^{\circ}$  W.

1899 *January*:  $33^{\circ}$  N.  $12^{\circ}$ — $15^{\circ}$  W.

*March*:  $47^{\circ}$  N.  $8^{\circ}$  W.

*April*:  $37^{\circ}$  N.  $9^{\circ}$  W. to  $42^{\circ}$  N.  $18^{\circ}$  W. and thence to the mouth of the Engl. Channel;  $9^{\circ}$  N.  $59^{\circ}$  W.

*May*:  $51^{\circ}$  N.  $14^{\circ}$ — $26^{\circ}$  W.;  $60^{\circ}$  N.  $4^{\circ}$  W.— $1^{\circ}$  E.;  $58^{\circ}$  N.  $2^{\circ}$  W. to  $57^{\circ}$  N.  $3^{\circ}$ — $6^{\circ}$  E.

*June*:  $20^{\circ}$  S.  $1^{\circ}$  E.;  $9^{\circ}$  S.  $12^{\circ}$  W. to  $1^{\circ}$  N.  $23^{\circ}$  W.;  $9^{\circ}$  N.  $25^{\circ}$  W.;  $61^{\circ}$ — $63^{\circ}$  N.  $1^{\circ}$  E.;  $62^{\circ}$  N.  $2^{\circ}$  E. to  $67^{\circ}$  N.  $11^{\circ}$  E.

*July*:  $11^{\circ}$  N.  $26^{\circ}$  W.;  $48^{\circ}$  N.  $23^{\circ}$ — $25^{\circ}$  W., common;  $56^{\circ}$ — $57^{\circ}$  N.  $15^{\circ}$ — $23^{\circ}$  W.;  $62^{\circ}$  N.  $0^{\circ}$  W., not rare.

*August*:  $48^{\circ}$  N.  $13^{\circ}$ — $20^{\circ}$  W., more or less rare;  $60^{\circ}$  N.  $3^{\circ}$  E.;  $55^{\circ}$  N.  $9^{\circ}$  and  $26^{\circ}$  W., rare;  $72^{\circ}$  N.  $26^{\circ}$  E.

*September*: area between  $51^{\circ}$  N.  $21^{\circ}$ — $28^{\circ}$  W. and  $56^{\circ}$  N.  $17^{\circ}$  W., rare;  $72^{\circ}$  N.  $19^{\circ}$  E. to  $76^{\circ}$  N.  $16^{\circ}$  E.

*November*:  $51^{\circ}$  N.  $13^{\circ}$  W., rare.

**Temperature:** 13.1, mean of 46 obs., max. 21, min. 6. (Samples containing this species sparingly not considered.)

**Salinity:** 35.12, mean of 44 obs., max. 36.13, min. 31.83.

**Plankton-type.** Found in the Pacific, the Indian Ocean and the Red Sea. In the Atlantic it follows the south Equatorial Current, west of Africa towards S. America, enters the Brazil Current and sparingly the northern Equatorial Current into the Caribbean Sea and the Florida Current. Very rare in the Sargasso Sea. It appeared very abundantly on the west coast of Africa towards the Azores, in the English Channel, off Iceland and in the Färöe Channel, sweeping in August—September round Iceland. From the Färöe Channel it enters the North Sea and follows the west coast of Norway to  $76^{\circ}$  N. — S.

**CERATIUM FUSUS** DUJ.<sup>1</sup>

(STEIN: D. Organ. d. Infusionsth. Pl. XV fig. 1—6.)

1897 *December* and1898 *January*: 41°—43° N. 22°—18° W.; 6° N. 55° W.; 37° N. 73° W.*February*: 34°—38° N. 73°—74° W.*March*: along the west coast of Africa, from 11° N. 19° W. to 31° N. 12° W.; 36° N. 29° W. to 48° N. 6° W. and 55° N. 12° W.; 61° N. 11° and 23° W., rare; 40° N. 68° W.*April*: 41° N. 19° W.; the whole English Channel; 63° N. 10° W. and 60° N. 19° W. to 62° N. 2° E., rare; 39° N. 74° W.; 42° N. 47° W.; 47° N. 40° W.; 57° N. 49° W., rare everywhere.*May*: Azores, rare; 50° N. 22° W. to the English Channel; area between 58° N. 23° W., 59° N. 28° W. and the Shetlands, thence into the North Sea to the west coast of Norway; 40° N. 72° W. to 46° N. 35° W., on many points.*June*: area between 40° N. 10° W., 34° N. 46° W., 41° N. 59° W. and 50° N. 12° W.; 57° N. 34°—38° W.; S. Iceland to N. Scotland and 62° N. 2° E.; 69° N. 15° E.*July*: area between the Azores, 49° N. 22° W. and 40° N. 60° W.; round Iceland, more or less common; area between Iceland, 58° N. 33° W. (common) and 59° N. 2° E. (rare, but common E. of the Färöes).*August*: Azores; 49° N. 20° W. (common) to 41° N. 72° W.; area between Rockall, Scotland, the Shetlands, E. and S. Iceland, more or less common.*September*: 48° N. 24° and 7° W.; area between 56° N. 19° W.; 65° N. 33° W. and 59° N. 1° W., more or less common; N. of Iceland. common; 70° N. 21° E. to 73° N. 19° E.; 43° N. 61° W., rare.*October*: 56°—57° N. 25°—18° W., not rare; S. Iceland to 59° N. 1° W., rare; 41° N. 67° W., rare.*November*: 56° N. 23° W., not rare; S. Iceland to the Färöes, rare; 47° N. 40° W. to 42° N. 58° W., rare to common.<sup>1</sup> Ostenfeld's data used. Murray's & Whitting's not used.

- December*: S. Iceland to Scotland, rare; 48° N. 40° W. to 42° N. 63° W., rare to common; 26° S. 45° W., rare.
- 1899 *January*: Färöes, rare; 40°—41° N. 66°—69° W.
- March*: 66° N. 14° W., very rare.
- April*: 41° N. 18° W.; 40° N. 36° W.; 49° N. 7° W., rare everywhere.
- May*: along 50° N. from 39° to 14° W., rare; W. of Scotland to 60° N. 4° W., rare; 60° N. 1° E. to 58° N. 9° E., varying from rare to common.
- June*: 20° S. 2° E.; 62° N. 1°—2° E. to 67° N. 11° E., as a rule rare.
- July*: 40° N. 38° W. to 48° N. 23° W., more or less rare; 57° N. 23° W.; 62° N. 0° W., not rare; 71° N. 32° E., very rare.
- August*: 55° N. 9° and 26° W., rare; 54° N. 46° W., rare.
- September*: 56° N. 17° W., common; 60° N. 3° E. to 67° N. 3° W., as a rule rare, but common at 63° N. 1° E.; 72° N. 19° E. to 77° N. 14° E.
- October*: 56° N. 15° W., not rare.
- November*: 51° N. 28° W., rare; 47° N. 51° W., not rare.

**Temperature**: 10.<sub>9</sub>, mean of 26 obs., max. 18, min. 5.

**Salinity**: 34.<sub>64</sub>, mean of 23 obs., max. 35.<sub>58</sub>, min. 31.<sub>96</sub>. (Only samples containing this species in abundance have been taken into calculation.)

**Plankton-type**. This common species occurs along the west coast of Africa and spreads, between the Azores and the English Channel, towards Iceland and the Färöe Channel, goes round Iceland and follows the Norwegian coast towards Beeren Island. In May it occurred across the whole Atlantic between 40°—60° N. — S.

### CERATIUM GENICULATUM LEMMERM.

(*Cer. fusus* var. *genic.* LEMMERMANN Abh. d. Naturw. Ver. Bremen Bd. XVI H. 2. Pl. I fig. 17.)

1898 *February*: 26° N. 74° W., very rare.

**Temperature**: 23.<sub>9</sub>.

**Plankton-type**. Found in the South Equatorial Current, 14° S. 27° W. — D.

**CERATIUM GRAVIDUM GOURRET.<sup>1</sup>**

(SCHÜTT: D. Peridinéen d. Plankton-exp. Pl. XI. fig. 81.)

1897 *December*: between 25° N. 50° W., 23° N. 51° W. and 23° N. 42° W.; Caribbean Sea; Azores.

1898 *January*: Caribbean Sea; Florida Current to 35° N. 74° W.; 11° N. 20° W.; 24° N. 17° W.; Azores.

*February*: 5° S. 0°—9° E.; 27°—28° N. 41°—39° W.; 21° N. 50° W. to 18° N. 76° W.; whole Caribbean Sea; N. of the Bahamas.

*March*: 4° S. 10° W.; 23° N. 28° W.; Caribbean Sea; 29°—31° N. 45°—42° W.; 43° N. 41° W.; 41° N. 23° W.

*April*: 19°—16° N. 52°—56° W.; Caribbean Sea; 31° N. 75° W.

*June*: 10° N. 52° W.; 42° N. 48° W.

*September*: 40° N. 65° W. to 46° N. 39° W.

*October*: Azores.

*November*: Azores; 22° N. 53° W.

*December*: 26° S. 45° W.; 25° N. 52° W.; Caribbean Sea; Azores.

1899 *February*: 32° N. 47° W.

*March*: Azores.

*April*: 32° N. 75° W.

*June*: 12° S. 8° W.

*November*: 49° N. 50° W.

**Temperature**: 22.4, mean of 34 obs., max. 27.3, min. 12.

**Salinity**: 35.99, mean of 21 obs., max. 37.41, min. 33.93.

**Plankton-type.** This species occurs in the Mediterranean and the Indian Ocean. In the Atlantic it follows the Equatorial Current into the Caribbean Sea and thence the Florida Current. It occurs in September between 40° and 45° N. in the western Atlantic and from December to March at the Azores and in the Sargasso Sea.  
— *D.*

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<sup>1</sup> Murray's & Whitting's data used.



**CERATIUM (?) HYPERBOREUM CL.<sup>1</sup>**

(Kongl. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. VIII fig. 14.)

1898 *August*: 81° N. 19° E.1899 *August*: 80° N. 16° E.**Temperature**: —0.30 and +2.12.**Salinity**: 25.36 to 33.93.**Plankton-type**: *Ng*.**CERATIUM LIMULUS GOURRET.<sup>2</sup>**

(SCHÜTT: D. Peridineen d. Plankton-exp. Pl. IX fig. 32.)

1897 *December*: area between 29° N. 36° W., 24°—25° N. 51°—50° W. and 12° N. 50° W.; Caribbean Sea.1898 *January*: 9°—10° N. 25° W.; 17° S. 37° W.; 7° N. 53° W.; Azores to 32° N. 34° W.; 29°—35° N. 74° W.*February*: 31° N. 35° W. to 25° N. 44° W.; Caribbean Sea; 30° N. 74° W. to 34° N. 73° W.*March*: area between the Azores, 30° N. 35° W., 29° N. 45° W. and 28° N. 38° W.; 10° N. 53° W.; Caribbean Sea.*April*: 41° N. 20° W. to 16° N. 56° W.; Caribbean Sea.*May*: 16°—24° N. 58°—51° W.; 30°—32° N. 44°—42° W.*June*: Azores.*July*: Azores; Caribbean Sea; 41° N. 58° W.*August*: Azores; 34° N. 73° W.*September*: Azores; Madeira; Bahamas.*October*: Azores.*November*: Azores; 36° N. 14° W.; 0° S. 31° W.;*December*: Canaries; Azores; 34° N. 38° W.; Porto Rico.1899 *January*: Canaries to Gibraltar.*February*: 32° N. 46° W.*March*: 24° N. 40° W.; Azores to the Engl. Channel.*April*: 41° N. 16° W.; 45° N. 13° W.; 28°—36° N. 74° W.*June*: 36° N. 30° W.*July*: 29° N. 40° W.; 12°—14° N. 27°—28° W.<sup>1</sup> According to a letter from JØRGENSEN the same as his *Gonyaulax ? triacantha*. JØRGENSEN's paper was not published when the above was written.<sup>2</sup> Murray's & Whitting's data used.

**Temperature:** 20.<sub>9</sub>, mean of 64 obs., max. 27.<sub>8</sub>, min. 14.

**Salinity:** 36.<sub>21</sub>, mean of 39 obs., max. 36.<sub>92</sub>, min. 33.<sub>88</sub>.

**Plankton-type.** This species follows the Equatorial Current into the Caribbean Sea, thence the Florida Current, only exceptionally beyond 35° N. It occurs in the Sargasso Sea to the Azores and Gibraltar. In March 1899 rare specimens drifted towards the Engl. Channel. — *D.*

### CERATIUM LINEATUM EBH.<sup>1</sup>

(*Cer. furca* var. *baltica* Möb. in SCHÜTT D. Peridineeën d. Plankton-expedition

Pl. IX fig. 36.

1897 *December:* 32°—34° N. 33°—30° W.; area between 24° N. 50° W., 19° N. 45° W. and 16° N. 48° W.; Caribbean Sea.

1898 *January:* 15°—16° S. 37° W.; 1° S. 27° W.; 14° N. 46° W.; Caribbean Sea; 25° N. 74° W.

*February:* 34° N. 31° W. to 25° N. 44° W.; Caribbean Sea; 34° N. 73° W.

*March:* 6°—7° N. 22°—21° W. to 16° N. 18° W.; area between 15° N. 49° W., 7° N. 55° W. and 14° N. 64° W.; 33°—37° N. 74° W.; 25° N. 41° W. to 45° N. 13° W.

*April:* 7° N. 54° W. to 14° N. 58° W.; Caribbean Sea; 31° N. 75° W.; Azores to 48° N. 8° W.

*May:* area between 11° N. 52° W., 57° N. 38° W., 60°—61° N. 20°—10° W. and 50° N. 14° W.

*June:* area between Cape Finisterre, the Canaries, 31° N. 50° W. and 48° N. 33° W.

*July:* Azores to 29° N. 44° W.; 41°—40° N. 58°—67° W.; area between 58° N. 32° W., 59° N. 6° W. and 63° N. 21° W.

*August:* 40° N. 66° W. to 45° N. 40° W., common; Azores; 48° N. 24° W.; Irish Channel; Shetlands to 57° N. 7° W.; S. of Iceland, across Denmark's Sound to E. Greenland.

*September:* Azores; 46° N. 11° W.; 41°—42° N. 65°—57° W.; Shetlands to 60° N. 6° W.; S. of Iceland to E. Greenland; 62° N. 21° W. to 65° N. 36° W.; 72° N. 19° E.

<sup>1</sup> Ostenfeld's data used.

*October:* Azores; 42° N. 64°—50° W.; 48° N. 29° W.; 57°—59° N. 27°—21° W.; 60° N. 4°—6° W.

*November:* 26°—24° S. 30°—29° W.; 5°—0° N. 33°—31° W.; Azores; 41°—43° N. 69°—61° W.; 48°—50° N. 29°—31° W.; 49° N. 12° W.

*December:* 26° S. 45° W.; Azores; Canaries; 43° N. 61°—57° W.

1899 *February:* 32° N. 47° W.

*March:* 24° N. 70° W.; 36° N. 29° W.; 35° N. 16° W.

*April:* 41°—42° N. 15°—18° W.; 49° N. 7° W.

*May:* 35° N. 76° W.; 50°—51° N. 33°—20° W.; 60°—61° N. 4°—5° W.; 58° N. 5° E.

*June:* 20° S. 2° E. to 3° S. 20° W.; 62° N. 0° E.

*July:* 20° N. 34° W.; area between 33° N. 41° W., 45° N. 31° W. and 48° N. 35° W.

*September:* 77° N. 14° E.

**Temperature:** 19.8, mean of 168 obs., max. 28, min. 4.78.

**Salinity:** 35.48, mean of 106 obs., max. 37.40, min. 31.96.

**Plankton-type.** This species occurs in the Red Sea, the Indian Ocean and the Bering Sea. In the Atlantic it has a very wide range of distribution between America and Africa—Europe, at least from 26° S., occurs from the winter to June in the Sargasso Sea and the Florida Current, and in the western Atlantic between 40° and 45° N., where it reaches its maximum in August. It occurs at the Azores the whole year, spreads thence, in May, northwards, at least to 50° N., in July to 60° N. It reaches in August S. Iceland and goes thence across Denmark's Sound to E. Greenland. — *S. (D.)*

### CERATIUM TRIPOS VAR. LONGIPES BAIL.<sup>1</sup>

(CL. Fifteenth annual report of the Fishery Board for Scotland, for 1896, pag. 302 fig. 2 inclusive *var. horrida* CL. l. c. fig. 4. *C. trip. v. tergestina* SCHÜTT. *C. tripos var. arctica* AURIV. p. p.)

1898 *March:* Azores, very rare; 64° N. 25° W., very rare; 62° N. 2° E.; 58° N. 6° E.; 40° N. 71° W.

*April:* SW. and S. of Iceland; Färöes; Färöe Channel; 59° N. 28° W.; 60°—62° N. 2°—9° W.; 39° N. 74° W., common.

<sup>1</sup> Ostenfeld's data used.

- May*: S. and E. of Iceland to the Färöes and Scotland, common at some points; 62° N. 2° E., rare; along the coast of Norway, from 58° to 66° N.; 40° N. 72° W. to 41° N. 59° W., as a rule common.
- June*: Iceland to the Färöes and Scotland; 58° N. 2° W., rare; 62° N. 2° E., common; along the coast of Norway from 67° to 72° N.; SE. of Spitzbergen.
- July*: NE. and S. of Iceland, common, thence to the Färöes, Scotland and to 59° N. 2° E.; 65° N. 5° W., not rare; SW. of Cape Farewell; 40° N. 69° W., common.
- August*: N. of Iceland; along the S. coast of Iceland to the Färöes; E. of Scotland; round Spitzbergen; W. of Greenland, 61°—62° N. 53°—56° W.
- September*: NE. and S. of Iceland, common to rare; S. of the Färöes; between Norway and Spitzbergen; S. of Greenland, 58°—60° N. 39°—55° W.; 48° N. 29° W.
- October*: along S. Iceland and thence to the Färöes; SE. of Cape Farewell; 42° N. 50° W.
- November*: S. of Iceland, rare; Färöes.
- December*: 47° N. 45° W. to 41° N. 66° W.
- 1899 *January*: Färöes, rare; 48° N. 39° W., common; 40°—41° N. 66°—69° W., very common to rare.
- March*: 64° N. 12° W., rare; 62° N. 7° W.
- May*: 64° N. 10° E., rare; 61° N. 1° E. to 58° N. 6° E., common to very common, less common to 58° N. 8° E.; 38° N. 74° W., not rare.
- June*: 67° N. 3° W.; rare; 62° N. 1° E., rare to common; 64° N. 7° E. to 67° N. 11° E., very common; 62° N. 2° E. to 78° N. 12° E., rare.
- July*: 74° N. 17° W., rare; 62° N. 0° W., not rare; 71°—73° N. 32°—36° E., not rare; 56° N. 38° W.
- August*: 72°—74° N. 26°—31° E., more or less common; 54° N. 46° W., rare.
- September*: 74° N. 17° W. to 65° N. 2° W., rare to common, abundantly at 67°—68° N. 4°—6° W.; 72° N. 19° E. to 79° N. 11° E., more or less scarce, but very common at 76°—77° N. 16°—14° E.; 47° N. 51° W., rare.
- Temperature**: 8.5, mean of 58 obs., max. 21, min. 4.1 (only such samples as contained this species abundantly considered).

**Salinity:** 34.<sub>02</sub>, mean of 58 obs., max. 35.<sub>58</sub>, min. 31.<sub>83</sub>.

**Plankton-type.** This species belongs to the arctic and Northern Atlantic. I have met with it in a sample from the Bering Sea. It has been seen in the west as far north as 74° N. From there it follows the E. Greenland Current to Iceland, where it occurs from April to November. From Iceland it goes round S. Greenland and continues with the southward current along America, at least to 38° N. In the other direction it spreads to the Färöes, Scotland, into the North Sea and to the W coast of Norway, which it follows, and continues round Spitzbergen and into the Murman Sea. In the E. it scarcely goes south of 58° N., but very rare specimens may drift as far as the Azores. — *T.* and *Ns.*

### CERATIUM MACROCEROS EHB.

(Cl. Fifteenth annual report of the Fishery Board for Scotland, for 1896, pag. 301 fig. 6.)

1898 *January:* 33° N. 31° W.

*February:* 30°—34° N. 74°—73° W.

*March:* 6° S. 4° W.; 7° N. 55° W.; 12° N. 51° W.; area between the Azores, 45° N. 13° W. and 41° N. 66° W.; 62° N. 2° E.; 60° N. 4° E.

*April:* 10° N. 52° W.; 44°—47° N. 45°—40° W.; Azores; Engl. Channel.

*May:* Azores; 41° N. 65° W. to 49° N. 23° W., common to rare; 50° N. 7° W.; 58° N. 4° E. to 58° N. 6° E.

*June:* area between the Canaries, the Azores and Cape Finisterre; 42° N. 50° W.; 40° N. 37° W.; 48° N. 33° W.; area between the Azores, 38° N. 41° W., 25° N. 57° W. and 23° N. 42° W.

*July:* Azores; 38° N. 74° W. to 40° N. 60° W.; 63° N. 1° W. to 59° N. 2° E., common.

*August:* Azores; 48° N. 30° W. to 40° N. 67° W.; 60° N. 3° E., common; 58° N. 0°—5° E., common.

*September:* Azores; 46°—47° N. 11°—9° W.; 70°—73° N. 21°—19° E., common.

*October:* Azores; 42° N. 50° W.

- November*: 18° S. 36° W.; Azores; 41° N. 66° W. to 47° N. 41° W.; 51° N. 20° W.; 36° N. 14° W.
- December*: Canaries; Azores; 41° N. 66° W. to 49° N. 35° W., at some points common.
- 1899 *January*: 34° N. 12° W., rare; 41°—40° N. 69°—66° W.
- March*: Azores; 46° N. 11° W.; 47° N. 8° W., everywhere rare.
- April*. 41° N. 17° W.; 46° N. 13° W., rare.
- May*: 25° S. 7° E.; 49°—50° N. 39°—33° W.; 57° N. 3°—9° E., rare to common; 59° N. 2° E., very rare.
- June*: 7°—9° N. 25° W.; 24° N. 42° W.; 64°—67° N. 7°—11° E., common to rare.
- July*: 12° N. 27° W.; 35°—38° N. 46° W.; 44°—49° N. 33°—23° W., rare; 62° N. 0° W., rare.
- August*: 48° N. 17° W., rare; 60° N. 3° E., common; 72° N. 26° E., very rare.
- September*: 56° N. 33° W., rare; 60° N. 3° E. to 62° N. 1° E., very common, thence rare to 67° N. 4° W.; 72° N. 19° E. (very common) to 77° N. 14° E. (rare).
- October*: 56° N. 23° (rare) and 31° W. (not rare).

**Temperature**: 12.3, mean of 20 obs., max. 24.2, min. 7.9 (only such samples as contained this species abundantly considered).

**Salinity**: 34.18, mean of 19 obs., max. 35.85, min. 30.62.

**Plankton-type**. The principal area of distribution is in the spring between the Azores, New York and the British Islands. It enters the North Sea, north of Scotland, and follows the Scandinavian coast into the Skagerak and to the north of Norway. In June 1898 it was seen scattered in several parts of the tropical Atlantic. It occurs in the Indian Ocean. — S.

### CERATIUM PARADOXIDES CL.

(K. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. VII fig. 14)

1898 *March*: 37° N. 24° W.

*September*: 46° N. 39° W.

1899 *January*: 33° N. 15° W.

**Temperature**: 17.3, mean of 3 obs., max. 18.4, min. 17.

**Salinity:** 36.33, mean of 3 obs., max. 36.66, min. 35.90.

**Plankton-type:** S.

### CERATIUM PLATYCORNE v. DADAY.

(Termézetrajzi Füzetek Vol. XI part 2, 1887—88 a Mus. nat. hungarica Budapestinensi vulgato pag. 101. — *C. tripos* var. *aurita* CL. 1897.)

1898 *January:* 44°—46° N. 17°—11° W.

*March:* Azores to the Engl. Channel.

*April:* Azores to the Engl. Channel; 40° N. 41° W.

*May:* 41° N. 16° W.; 48° N. 28° W. to 41° N. 60° W.

*September:* Engl. Channel.

*October:* 57° N. 27° W.

*November:* area between 50° N. 21° W., 56° N. 23°—30° W. and 50° N. 10° W.

*December:* Canaries; area between 42° N. 16° W., Cape Finisterre and 50° N. 9° W.

1899 *February:* 34° N. 40° W.

*March:* area between 44° N. 16° W., 46° N. 11° W. and 47° N. 8° W.

*April:* area between 40° N. 16° W., 46° N. 13° W. and 42° N. 18° W.

*October:* 56° N. 31° W.

*November:* 51° N. 13° and 21° W.

**Temperature:** 14.3, mean of 37 obs., max. 20.6, min. 9.6.

**Salinity:** 36.19, mean of 29 obs., max. 36.71, min. 35.03.

**Plankton-type.** This species is confined to the eastern Atlantic, between the Azores and the English Channel, but in May the area of distribution expands between 40° and 50° N. towards the Newfoundland Banks, and rare specimens drift in October nearly to 60° N. — S.

**CERATIUM RANIPES** CL.

(K. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. VII fig. 1).

1897 *December*: 19° N. 45° W.; 32° N. 33° W.1898 *January*: 25° N. 74° W.*February*: 13° N. 69° W.; 26°—34° N. 74° W.*March*: 10° N. 53° W.; 30° N. 35° W.*April*: 10° N. 53° W.; 12° N. 51° W.*May*: 16° N. 50° W.*October*: 26° N. 76° W.*December*: 49° N. 35° W.; Azores.**Temperature**: 21.<sub>2</sub>, mean of 14 obs., max. 26.<sub>9</sub>, min. 14.**Salinity**: 36.<sub>11</sub>, mean of 3 obs., max. 36.<sub>52</sub>, min. 35.<sub>63</sub>.**Plankton-type.** This species follows the Equatorial, Antilles- and Florida Currents, and towards the winter is conveyed to the Azores — *D.***CERATIUM REFLEXUM** CL.

(K. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. VII fig. 8, 9 E)

1898 *November*: 19° S. 31° W., very rare.**Temperature**: 25.<sub>1</sub>.**Salinity**: 37.<sub>26</sub>.**Plankton-type.** Noted from 38° N. 47° W. (June 1892 E. LÖNNBERG) — *D.***CERATIUM RETICULATUM** (POUCHET).<sup>1</sup>*C. hexacanthum* var. *contortum* LEMM. Abh. Nat. Ver. Bremen Vol. XVI H. 2 Pl. II f. 20, 21 — SCHÜTT Pflanzenl. d. Hochsee pag. 268 VII C, without name).1898 *January*: 12° N. 19° W.*February*: 5° S. 9° W.; Caribbean Sea and the Antilles Current (13° N. 70° W. to 26° N. 74° W.).*March*: 4° S. 10° W. to 18° N. 18° W.; 30° N. 35° W.; 39° N. 25° W.; 44° N. 16° W.; 51° N. 27° W.*April*: 41—46° N. 19—16° W.; 34° N. 74° W.<sup>1</sup> Ostenfeld's data used.



*May*: 27° N. 48° W.; 31° N. 36° W.; 38° N. 21° W.; 41° N. 16° W.; along 49° N. from 14° to 26° W.; 41° N. 51° W.

*June*: 10° N. 53° W.; 19° N. 63° W.; 23° N. 42° W.; 34° N. 46° W.; 35° N. 21° W., 44° N. 16° W.

*July*: 41° N. 48° W.; 48°—49° N. 21°—32° W.; 62° N. 0° W., very rare.

*August*: Azores; 48° N. 23° W. to 50° N. 12° W.; 41° N. 57°—58° W.

*September*: 9° N. 53° W.; 46° N. 11° W. to 48° N. 24°—7° W.; 49° N. 21° W.; 56° N. 21° W. (rare dead); 38° N. 74° W. to 41° N. 65° W.

*October*: 21° S. 36° W.; 57°—58° N. 27°—25° W.

*November*: 0° S. 31° W.; 36° N. 14° W.; 45° N. 7° W.; 42° N. 64° W.; 47° N. 41° W.

*December*: 30° N. 16° W.; Azores.

1899 *January*: 35° N. 9° W.,

*March*: 35° N. 16° W.; 47° N. 8° W.; 21° N. 43° W.; 30° N. 35° W.; 36° N. 29° W.

*April*: 41° N. 17° W. to 49° N. 7° W.

*June*: 14° S. 6° W.; 4° S. 19° W.; 9° N. 25° W.; 21° N. 45° W.

*September*: 56° N. 23° W.; very rare.

*November*: 51° N. 28° W., very rare.

**Temperature**: 19.<sub>4</sub>, mean of 77 obs., max. 28, min. 6.

**Salinity**: 36.<sub>45</sub>, mean of 53 obs., max. 37.<sub>28</sub>, min. 33.<sub>20</sub>.

**Plankton-type.** This species occurs in the Mediterranean and the Indian Ocean. In the Atlantic it follows the south Equatorial Current along S. Africa and to the north coast of S. America, enters the Caribbean Sea and the Florida Current. On the east side it spreads to the Canaries, the Azores and the West of Europa, where very rare specimens drift as far as 62° N. — *S. (D)*.

### CERATIUM TRIPOS Duj.<sup>1</sup>

(CL. Fifteenth annual report of the Fishery Board for Scotland, for 1896, pag. 301 fig. 1.)

1898 *January*: 8° N. 21° W.; 20°—21° N. 18°—17° W.; 33° N. 31° W.; 35°—37° N. 74°—73° W. (common).

<sup>1</sup> Ostenfeld's, but not Murray's & Whitting's data used.

*February*:  $26^{\circ}$ — $38^{\circ}$  N.  $74^{\circ}$  W.

*March*:  $6^{\circ}$  S.  $4^{\circ}$  W.; area between  $3^{\circ}$  N.  $16^{\circ}$  W., Cape Verde Islands and  $23^{\circ}$  N.  $17^{\circ}$  W.; Canaries;  $33^{\circ}$  N.  $32^{\circ}$  W. to  $48^{\circ}$  N.  $6^{\circ}$  W.;  $10^{\circ}$  N.  $53^{\circ}$  W. to  $15^{\circ}$  N.  $49^{\circ}$  W.;  $32^{\circ}$  N.  $74^{\circ}$  W.  $37^{\circ}$  N.  $74^{\circ}$  W.;  $40^{\circ}$  N.  $68^{\circ}$  W.; to  $41^{\circ}$  N.  $60^{\circ}$  W.

*April*:  $10^{\circ}$  N.  $52^{\circ}$  W.;  $39^{\circ}$  N.  $74^{\circ}$  W. to  $40^{\circ}$  N.  $70^{\circ}$  W., common.  $39^{\circ}$  N.  $24^{\circ}$  W.;  $59^{\circ}$  N.  $22^{\circ}$  W. to  $62^{\circ}$  N.  $2^{\circ}$  E., on the whole rare.

*May*: across the whole Atlantic, from  $41^{\circ}$  N.  $63^{\circ}$  W., where very common, to the mouth of the Engl. Channel (common between  $50^{\circ}$  N.  $7^{\circ}$  W. and  $48^{\circ}$  N.  $25^{\circ}$  W.). area between  $59^{\circ}$  N.  $19^{\circ}$  W.,  $63^{\circ}$  N.  $10^{\circ}$  W. and  $61^{\circ}$  N.  $1^{\circ}$  W., common at the Färöes, but not abundant elsewhere;  $58^{\circ}$  N.  $3^{\circ}$  E., common; common along the coast of Norway, from  $58^{\circ}$  to  $64^{\circ}$  N.

*June*:  $40^{\circ}$  N.  $10^{\circ}$  W. to  $43^{\circ}$  N.  $9^{\circ}$  W., not rare;  $44^{\circ}$ — $46^{\circ}$  N.  $16^{\circ}$ — $11^{\circ}$  W.;  $42^{\circ}$  N.  $50^{\circ}$  W.;  $60^{\circ}$  N.  $9^{\circ}$ — $3^{\circ}$  W., common at  $4^{\circ}$  and  $8^{\circ}$  W.;  $62^{\circ}$  N.  $3^{\circ}$  E.;  $67^{\circ}$  N.  $10^{\circ}$  E., common;  $69^{\circ}$  N.  $15^{\circ}$  E., rare;  $72^{\circ}$  N.  $22^{\circ}$  E., rare.

*July*:  $50^{\circ}$  N.  $10^{\circ}$  W.;  $50^{\circ}$  N.  $22^{\circ}$  W.;  $48^{\circ}$  N.  $30^{\circ}$  W.;  $41^{\circ}$  N.  $49^{\circ}$  W. to  $40^{\circ}$   $69^{\circ}$  W., where very common; area between  $58^{\circ}$  N.  $33^{\circ}$  W.,  $63^{\circ}$  N.  $1^{\circ}$  W. and  $59^{\circ}$  N.  $2^{\circ}$  E., on the whole very common;  $78^{\circ}$  N.  $1^{\circ}$  E. ( $\nu$ , deep sea haul).

*August*:  $56^{\circ}$  N.  $28^{\circ}$ — $34^{\circ}$  W., common;  $56^{\circ}$  N.  $13^{\circ}$  and  $20^{\circ}$  W., not rare; E. of Iceland, common; W. of Scotland, more or less rare; area between  $62^{\circ}$  N.  $16^{\circ}$ — $18^{\circ}$  W.,  $60^{\circ}$  N.  $3^{\circ}$  E. and  $58^{\circ}$  N.  $1^{\circ}$  E., common from the Färöes to Norway;  $38^{\circ}$ — $40^{\circ}$  N.  $74^{\circ}$ — $72^{\circ}$  W., very common;  $40^{\circ}$ — $41^{\circ}$  N.  $67^{\circ}$ — $58^{\circ}$  W., not common.

*September*: Engl. Channel, rare;  $56^{\circ}$  N.  $35^{\circ}$ — $12^{\circ}$  W., not common; area between  $60^{\circ}$  N.  $26^{\circ}$  W.,  $63^{\circ}$  N.  $27^{\circ}$  W., Färöes,  $60^{\circ}$  N.  $3^{\circ}$  E. and  $56^{\circ}$  N.  $13^{\circ}$  W., as a rule very common; N. of Iceland, common; Tromsøe to Beeren Island, not common.

*October*: area between  $56^{\circ}$  N.  $31^{\circ}$  W.,  $58^{\circ}$  N.  $35^{\circ}$  W., S. Iceland and  $59^{\circ}$  N.  $1^{\circ}$  W. as a rule very common;  $41^{\circ}$  N.  $67^{\circ}$ — $59^{\circ}$  W., not common,

*November*: Rio Janerio, not rare;  $6^{\circ}$  S.  $33^{\circ}$  W., rare;  $51^{\circ}$  N.  $20^{\circ}$  W., not rare;  $56^{\circ}$  N.  $26^{\circ}$ — $30^{\circ}$  W., common; S. Iceland

(not common) to 60° N. 1° W., as a rule common; 41° N. 66°—69° W., common to rare.

*December*: 26° S. 45° W., not rare; 18° N. 67° W., not rare; 62° N. 10° W., not rare; 63° N. 21°—18° W. rare; 47° N. 44° W. to 41° N. 66° W., common.

1899 *January*: Färöes, rare; 40° N. 66° W., common.

*April*: 9° N. 59° W., rare.

*May*: 51° N. 14° W., rare; 60° N. 5° W. to 58° N. 2° E., common, and thence to Skagerak common; 50° N. 39° W.; 35°—38° N. 75°—74° W., more or less common.

*June*: 20° S. 2° E., rare; 62° N. 0° W.—2° E., common; 64° N. 7° E., (common) to 67° N. 11° E., (rare).

*July*: 48° N. 25° W., not rare; 53° N. 42° N., rare; 62° N. 0° W., common.

*August*: 48° N. 13° W., rare; 55° N. 9° W. to 54° N. 46° W., rare; 60° N. 3° E., not rare; 72° N. 26° E., very rare.

*September*: 57° N. 16° W. to 56° N. 38° W., rare to common; 60°—62° N. 3° to 1° E., common to rare; 72°—73° N. 19° E., more or less common.

*October*: 52° N. 14° W. to 53° N. 37° W., rare to very common.

*November*: 51° N. 13° (rare) and 28° (not rare) W.

**Temperature**: 11.4, mean of 99 obs., max. 28.2 min. 6.5 (only such samples as contained this species abundantly have been considered).

**Salinity**: 34.92, mean of 95 obs., max. 35.82, min. 30.62.

**Plankton-type**. *Ceratium tripos* has the same distribution as other species of the Styli-plankton and is much more abundant in the east than in the west Atlantic. In May its area extends across the whole Atlantic, between 40° and 50° N. Later it advances towards Iceland and the Färöe Channel, enters the North Sea and follows the Scandinavian coasts, nearly to Beeren Island — S.

### CERATIUM (TRIPOS VAR.) VOLANS CL.

(K. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. VII fig. 4).

1898 *January*: 16°—21° N. 18°—17° W.; 41°—44° N. 21°—17° W.; 11°—14° N. 52°—49° W.

- February*: Caribbean Sea; 30° N. 74° W.  
*March*: area between 18° N. 18° W., Cape Verde Islands and 26° N. 29° W.  
*April*: 41° N. 19° W.; 32° N. 75° W.  
*May*: 7° N. 54° W.; area between 23° N. 56° W. and 26°—30° N. 42° W.; 41° N. 51° W.  
*June*: 28°—30° N. 53°—52° W.  
*July*: Caribbean Sea.  
*August*: 41° N. 57° W. to 44° N. 42° W.; Azores.  
*September*: 42° N. 57° W.; Azores.  
*October*: 38° N. 74° W.  
*November*: 19° S. 31° W.; 8° N. 28° W. to 13° N. 27° W.; area between the Azores, Madeira and 34° N. 10° W.; 42° N. 64° W.; 22° N. 53° W.  
*December*: 26° S. 45° W.; Porto Rico; 25° N. 52° W.; 34° N. 38° W.; Azores; Canaries.
- 1899 *January*: 32°—34° N. 16°—15° W.  
*March*: 18° N. 45° W.; 36° N. 29° W.  
*April*: 9° N. 59° W.; 28° N. 74° W.; 24° N. 42° W.  
*June*: 19° S. 1° W.; 27° N. 39° W.  
*July*: 19° N. 33° W.; 30° N. 41° W. to 42° N. 36° W.
- Temperature**: 21.9, mean of 66 obs., max. 28, min. 13.  
**Salinity**: 36.19, mean of 50 obs., max. 37.63, min. 32.62.  
**Plankton-type**: D

### CERATIUM (TRIPOS VAR.) VULTUR CL.

(K. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. VII fig. 5.)

- 1897 *December*: and  
 1898 *January*: 7° N. 53° W. to 19° N. 45° W.; 25° N. 74° W.  
*February*: Caribbean Sea; Bahamas; area between 12° N. 51° W., 7° N. 54° W. and 9° N. 59° W.; 32° N. 32° W.; 41°—43° N. 49°—41° W.; 45° N. 36° W.  
*March*: 10° N. 52° W.; Caribbean Sea.  
*June*: 23° N. 42° W.  
*July*: 21° N. 58° W.; 33° N. 74° W.  
*August*: 14° N. 70° W. to 34° N. 73° W.; 40° N. 67° W. to 42° N. 50° W.

*September*: 41° N. 65° W.

*October*: 21° S. 36° W.

*November*: 19° N. 58° W. to 32° N. 38° W.; 20° N. 23° W.

1899 *March*: 35°—37° N. 16°—26° W.

*June*: 14° S. 7° W.; 8° S. 13° W.

**Temperature**: 24.4, mean of 36 obs., max. 27.8, min. 8.

**Salinity**: 35.60, mean of 28 obs., max. 37.43, min. 33.20, (exceptionally 28.10).

**Plankton-type**. Occurs in the Indian Ocean — *D*.

### CERATOCORYS HORRIDA STEIN.<sup>1</sup>

(D. Org. d. Infusionsth. Pl. VI. fig. 4—11.)

1897 *December*: and

1898 *January*: 16°—15° S. 37° W.; area between 1° S. 29° W., 11° N. 20° W. and 9° N. 28° W.; area between 24° N. 50°—40° W. and 29° N. 36° W.; 11°—12° N. 52°—50° W. Caribbean Sea; 25°—32° N. 74° W.

*February*: 5° S. 4° E.; 34° N. 31° W. to 25° N. 43° W.; Caribbean Sea; 21°—34° N. 74° W.

*March*: area between 4° S. 10° W., 2° N. 25° W. and the Cape Verde Islands; 32°—29° N. 34°—38° W.; area between 9° N. 53°—59° W. and 14° N. 50° W.; Caribbean Sea; 28°—32° N. 74° W.

*April*: 32° N. 34° W. to 29° N. 38° W.; 22° N. 47° W. to Barbados; Caribbean Sea; 27°—31° N. 75° W.

*May*: area between 32° N. 42° W., 11° N. 52° W. and 20° N. 60° W.; Caribbean Sea; 41° N. 60° W.; 46° N. 31° W.

*June*: 19° N. 63° W. to Porto Rico.

*July*: 25° N. 48° W.; 20° N. 58° W.; Caribbean Sea; 15° N. 71° W. to 38° N. 74° W., thence to 42° N. 48° W.

*August*: Caribbean Sea; 34° N. 74° W.; 40° N. 66° W. to 44° N. 42° W.

*September*: 8°—12° N. 25°—27° W.; 20°—29° N. 74° W.; 41° N. 65° W., 42° N. 57° W.; 47° N. 36° W.

<sup>1</sup> Murray's & Whitting's data used.

- October:* 21° S. 36' W.; 9' S. 34° W.; Cape Verde Islands; Canaries; Caribbean Sea to 38° N. 74' W.; 41° N. 58° W.
- November:* 18—19° S. 31' W.; 4° N. 30' W.; 26° N. 48° W. to 19° N. 58' W.; 42° N. 62° W.; 47° N. 41° W.; 36° N. 14' W. to 34° N. 10' W.
- December:* 25° N. 52° W. to 22° N. 56° W.; Caribbean Sea; Canaries; Gibraltar.
- 1899 *January:* area between the Canaries, Madeira and 35° N. 9' W.
- February:* 32° N. 47' W.
- April:* 36° N. 74° W.
- May:* 35° N. 75° W.
- June:* 12° S. 9' W.; 4° S. 19° W. to 9° N. 25° W.; 12° N. 52° W.
- July:* 10° N. 26° W.

**Temperature:** 23.5, mean of 129 obs., max. 28.3, min. 13.8.

**Salinity:** 35.78, mean of 99 obs., max. 38.54, min. 32.92.

**Plankton-type.** Noted from the Mediterranean, Indian and Pacific. It occurs in the tropical Atlantic, at least from 21° S., between S. America and Africa, follows the Equatorial Current to the north coast of S. America, into the whole Sargasso Sea and the Caribbean Sea, thence the Florida Current. From July to September (maximum in August) it advances in the western Atlantic between 40° and 45° N. (rare specimens nearly to 50°). In the winter it occurs from Gibraltar to the Canaries. — *D.*

### CITHARISTES APSTEINII SCHÜTT.<sup>1</sup>

(D. Peridinéen d. Plankton-expedition Pl. V fig. 24).

- 1897 *December:* 23°—25° N. 51°—50° W.
- 1898 *February:* 28° N. 39° W. to 19° N. 52° W.
- March:* Azores to 29° N. 45° W.; Caribbean Sea.
- April:* 19° N. 52° W. to 16° N. 56° W.; Caribbean Sea; N. coast of San Domingo.

<sup>1</sup> Murray's & Whiting's data used.

**Temperature:** 22.8, mean of 13 obs., max. 27.7, min. 21.10.

**Salinity:** 36.63 (one obs.).

**Plankton-type.** *D.*

### CLADOPYXIS BRACHIOLATA STEIN.<sup>1</sup>

(D. Org. d. Infusionsth. Pl. II fig. 7.)

1898 *March:* 17° N. 47° W.; 29°—31° N. 45°—42° W.

*April:* 19°—22° N. 52°—47° W.

*May:* 28°—26° N. 47°—52° W.

*June:* 23°—24° N. 42° and 58° W.; 39° N. 39° W.; Cape Finisterre; 31° N. 17° W.

*July:* 38° N. 74° W.; 41° N. 58°—48° W.; 34° N. 33° W.; 29° N. 44° W.

*August:* 40° N. 66° W. to 44° N. 42° W.; 49° N. 20° W.; 50° N. 10° W.

*September:* 30° N. 35° W. to the Azores; 45° N. 14° W.

*October:* Azores; 34° N. 74° W.

*November:* 19°—18° S. 31° W.; 29° N. 43° W. and 36° N. 14° W.

1899 *June:* 18° N. 47° W.; 27° N. 39° W.

**Temperature:** 22.7, mean of 35 obs., max. 27.2, min. 14.8.

**Salinity:** 35.94, mean of 29 obs., max. 37.50, min. 33.20.

**Plankton-type:** *D.*

### DINOPHYSIS ACUTA EHB.<sup>2</sup>

(SCHÜTT: D. Peridineen d. Plankton-expedition Pl. I fig. 4.)

1898 *March:* 61° N. 23° W.; N. of Scotland; 23° N. 74° W. (one specimen).

*April:* 58°—59° N. 22°—50° W.; Färöe Channel.

*May:* area between S. Iceland, Scotland, N. of Rockall and 59° N. 38° W.; 58° N. 5° E. to 64° N. 6° E.

<sup>1</sup> Murray's & Whitting's data used.

<sup>2</sup> Ostenfeld's data used.

- June*: 57° 59' N. 34°—42° W.; NW. and S. of Iceland; NW. of the Färöes; 60° 61' N. 4°—14° W.; 62° N. 2° 30' E.; 40°—44° N. 9°—10° W.
- July*: S. of Iceland to about 63° N. 1° W.; 59° N. 2° W. to the N. of Rockall and along 58°—60° N. to the S. of Greenland.
- August*: N. and S. of Iceland to the Shetlands; W. of Scotland; Irish Channel. Between S. Iceland and E. Greenland (66° N. 37° W.); 58° N. 5° E.; N. of Spitzbergen; 55°—54° N. 41°—47° W.
- September*: N. of Iceland; N. of the Färöes to S. of the Shetlands; 70° N. 20° E.; Denmark's Sound; E. Greenland; from Iceland to Rockall; 62°—56° N. 14° W. to 60°—54° N. 55°—43° W.
- October*: S. Iceland to Scotland, thence to 58° N. 25° W.; 55°—58° N. 29°—32° W. to SW. of Cape Farewell, maximum at 58° N. 32° W.
- November*: S. Iceland to Scotland; S. of Rockall (56° N. 17° W.) to 54° N. 44° W. (maximum at 53°—56° N. 32°—36° W.); 45° N. 52° W.; 41° N. 69° W.
- December*: 49° N. 27° W. to 47°—42° N. 44°—49° W. and along the American coast to 41° N. 66° W.
- 1899 *May*: 66° N. 10° W.; 59°—60° N. 3° W.—2° E.; 58° N. 2° W.; 57° N. 3°—9° E.; 50° N. 33° W.
- June*: 66°—67° N. 10°—11° E.
- July*: 57° N. 31° W. to 53° N. 42° W., common.
- August*: 72°—73° N. 26°—31° E.; 55° N. 26° W. to 54° N. 46° W., not rare.
- September*: 72° N. 19° E. to 80° N. 13° E.; 56° N. 30° W. to 52° N. 55° W., not rare to common.
- October*: 53° N. 31° W. to 54° N. 45° W., more or less rare.
- November*: 51° N. 28° W., not rare; area between 52° N. 48° W., 53° N. 43° W. and 48° N. 46° W., not rare.

**Temperature:** 9.5, mean of 44 obs., max. 12 s, min. 5.

**Salinity:** 35.08, mean of 44 obs., max. 35.15, min. 32.01.

**Plankton-type.** I have found this species in a sample from Puget's Sound. *Dinophysis acuta* is a characteristic boreal form, that inhabits the area between Greenland, S. Iceland and Scotland.



I found it exceptionally (one specimen) in the Florida Current (23° N.) and in the eastern Atlantic sparingly on the coast of Portugal. The occurrence in the Gulf of Naples (SCHRÖDER) is very strange. —*Ng*

### DINOPHYSIS HASTATA STEIN.<sup>1</sup>

(D. Org. d. Infus. Pl. XIX fig. 12.)

- 1898 *May*: 36° N. 27° W.; 46° N. 35° W. to 41° N. 51° W.  
*August*: 40° N. 66° W. 44° N. 42° W.; 56° N. 34° W.; 61° N.  
 8° W.  
*September*: 60° N. 6° W.  
*November*: 60° N. 4° W.  
*December*: 62° N. 10° W.  
 1899 *March*: 47° N. 8° W.  
*June*: 11° S. 10° W. to 19° S. 1° W.  
*July*: 23° N. 36° W.; 32° N. 41° W.

**Temperature:** 17.6, mean of 18 obs., max. 25.1, min. 7.0.

**Salinity:** 35.71, mean of 18 obs., max. 37.86, min. 33.93.

**Plankton-type:** This species occurs in the Indian Ocean. It ranges in the Atlantic at least from 19° S. to 62° N. and has, essentially, an eastern distribution. — S.

### DINOPHYSIS HOMUNCULUS STEIN.<sup>1</sup>

(D. Org. d. Infus Pl. XXI fig. 1—8.)

- 1898 *January*: 10° N. 20° W.; 21° N. 17° W.; 17° N. 38° W.; Caribbean Sea; 37° N. 73° W.; 34° N. 31° W. to 38° N. 25° W.  
*February*: 34° N. 31° W.; 32° N. 34° W.; Caribbean Sea; 34° N. 73° W.  
*March*: 18°—21° N. 18° W.; area between 35° N. 28° W., 29° N. 45° W. and 45° N. 19° W.; 43° N. 48° W.  
*April*: area between 29° N. 38° W., 43° N. 50° W. and 50° N. 9° W.; 31°—34° N. 75°—74° W.  
*May*: 11° N. 52° W.; 30° N. 44° W.; 32° N. 36° W.; 34° N. 40° W.; area between 38° N. 21° W., 50° N. 7° W. and

<sup>1</sup> Ostenfeld's and Murray's & Whitting's data used.

41° N. 56° W.; area between 60° N. 10° W., 59° N. 16° W. and 61° N. 19° W.

*June*: area between the Canaries, Portugal and Cape Finisterre; 60° N. 4° W.; 50° N. 12° W.; 42° N. 50° W.; 33° N. 48° W.

*July*: area between 34° N. 33° W., 49° N. 22° W. and 44° N. 39° W.; 40° N. 67° W. to 41° N. 58° W.; 58° N. 27° W.; 63° N. 8° W.

*August*: area between the Azores, New York and 49° N. 23° W.; Färöes.

*September*: Azores; 47° N. 33° W.

*October*: 41° N. 59° W.

*November*: Rio Janeiro; 40° N. 67° W., 50° N. 30° W.; Azores; Madeira.

*December*: Azores.

1899 *January*: Madeira; 48° N. 39° W.; 41° N. 69° W.

*March*: 36° N. 16° W.; Azores.

*April*: 44° N. 15° W.

*May*: 50° N. 33°—39° W.; 35° N. 75° W.

*July*: 38° N. 39° W. to 48° N. 23° W., not rare; 53° N. 42° W., common.

*September*: 55° N. 44° W. to 53° N. 51° W., rare.

*October*: 54° N. 45° W., not rare.

*November*: 51° N. 28° W. to 52° N. 48° W., rare.

**Temperature:** 18.5, mean of 100 obs., max. 27.2, min. 6.

**Salinity:** 35.54, mean of 77 obs., max. 36.54, min. 31.01.

**Plankton-type.** This species has been found in the Mediterranean, Indian and Pacific. It occurs both in the western and eastern Atlantic. In the *west* it was found rarely at Rio Janeiro, sparingly in the North Equatorial Current, Caribbean Sea and Florida Current, reached in July the latitude of New York and approached the Newfoundland Banks. Rarely seen in the Sargasso Sea. In the *east* it occurs along the African coast in the Cape Verde region and round the Azores, where it is stationary during the whole year. In April it spreads towards the English Channel and to the South of the Newfoundland Banks. In May and June it had advanced to the Färöe Channel. In July and August it reached its maximum and was found across the whole Atlantic between 40°—45° N., later it became more scarce. — *S. (D.)*

DINOPHYSIS MICHAËLIS (EBH.?) AURIV.<sup>1</sup>

(*D. levis* CLAP. & LACHM. *D. levis* BERGH? *D. rotundata* CLAP. & LACHM.? SCHÜTT *D. Peridin.* Pl. I fig. 5. *D. rotundata* STEIN. *Phalacroma operculoides* CL. K. Sv. Vet. Akad. Handl. Vol. XXXII n. 3 pag. 40 non SCHÜTT.)

1898 *March*: 58° N. 6° E.

*April*: 61° N. 6° W.

*May*: 63° N. 10°—17° W., not rare; 62° N. 2° E., rare; 59°—60° N. 10° W., rare; 59° N. 16° W., not rare; 59° N. 28° W., very rare.

*June*: S. Iceland to 60° N. 4° W., rare; 57° N. 34°—38° W., rare; 63° N. 56° W., very rare; N. of Iceland, 67° N. 24° W.; 68° N. 13° E.; 40° N. 10° W.

*July*: round Iceland to 60° N. 4° W.; 58°—59° N. 27°—22° W.

*August*: area between 63° N. 25° W., 60° N. 3° W. and 66° N. 15° W.; 76°—80° N. 11° E.; 78° N. 26°—28° E.; 66° N. 37° W.; 62°—69° N. 56°—53° W.; 41° N. 72° W.

*September*: N. of Iceland; area between 60° N. 4° W., 65° N. 36° W. and 57° N. 42° W., as a rule rare; 57° N. 42° W.; 59° N. 50° W.; 60° N. 55° W.; Disco; 73° N. 19° E.

*October*: S. Iceland to the Shetlands, rare; 58° N. 32° W., rare; 57° N. 42° W., rare.

*November*: 60° N. 4° W., very rare; 41° N. 69° W., rare.

1899 *May*: 64°—66° N. 10°—14° W.

*June*: 66° N. 10° E.; 70° N. 20° E. to 78° N. 12° E., rare.

*August*: 72° N. 26° E.

*September*: 73°—80° N. 19°—13° E., rare.

**Temperature**: 7.3, mean of 39 obs., max. 21, min. 1.2.

**Salinity**: 34.44, mean of 38 obs., max. 35.66, min. 30.98.

**Plankton-type**: Ns. T.

<sup>1</sup> Ostenfeld's data used.

**DINOPHYSIS OVUM SCHÜTT.**

(D. Peridineen d. Plankton-exp. Pl. I fig. 6.)

1898 *August*: 41° N. 58' and 72° W.*October*: 41° N. 59° W.1899 *January*: 35° N. 9° W.*March*: 35° N. 16° W.; 37° N. 26° W.**Temperature**: 19.1, mean of 6 obs., max. 25.5, min. 15.6.**Salinity**: 34.62, mean of 5 obs., max. 36.47, min. 31.01.**Plankton-type**: S. ?**DINOPHYSIS SACCULUS STEIN.**

(Org. d. Infusionsth. Pl. XX fig. 10—12.)

1898 *June*: 40°—42° N. 10°—9° W.**Temperature**: 14.8—15.8.**Plankton-type.** Found in the Mediterranean. My specimens occurred in Styli-plankton, and as no specimens were found in the open Atlantic, this species may be considered as neritic. — *Nm.***DINOPHYSIS VANHÖFFENI OSTENF.***(D. granulata* CL. K. Sv. Vet. Akad. Handl. Vol. XXXII n. 3 pag. 39 Pl. IV fig. 7 a small form). *D. orata* VANHÖFFEN Grönl.-Exp. II Pl. V. fig. 7. *D. Vanhöffeni* (OSTENF. Iakttagelser etc. 1898 pag. 59.)1898 *May*: area between 57° N. 28° W., 61° N. 23° W. and 60° N. 10° W., rare.*June*: Westmannaö to 60° N. 4°—8° W., as a rule rare, but common at 63° N. 10° W.; 57° N. 34°—42° W., as a rule rare; Disco, rare.*July*: 63°—65° N. 14°—24° W., rare; 58° N. 44° W., rare; 78° N. 0° W.—5° E.*August*: 64° N. 21° W.; 60° N. 3° W.; 66° N. 37° W.; W. of Greenland 66°—69° N. 55°—53° W., everywhere rare; 80°—81° N. 19°—30° E., rare.<sup>1</sup> Ostenfeld's data used.

- September*: 65°—68° N. 55°—53° W., rare.  
 1899 *May*: 56° N. 1° W. to 59° N. 2° W.  
*June*: Westmannaö, common to rare; 62° N. 1° E.; 65° N. 10° E.; 78° N. 12° E.  
*July*: 52° N. 54° W., not rare.  
*September*: 72° N. 19° E. to 81° N. 16° E., as a rule rare, but common at 78° N. 12° E.; 52° N. 55° W., not rare.

**Temperature**: 5.9, mean of 21 obs., max. 9.8, min. — 0.9.

**Salinity**: 34.33, mean of 21 obs., max. 35.11, min. 32.03.

**Plankton-type**. I found this species in a sample from Jedo Bay, Japan. It is difficult to decide to what plankton-type this species belongs. It occurs at Spitzbergen among drift-ice and together with arctic forms, but on the other hand it has not been seen, as true arctic species, north of Iceland along east Greenland. — *Ns?* *T?*

### DINOPYXIS COMPRESSA (BAIL.)

(*Eruciella marina* SCHÜTT D. Peridineen d. Plankton-exp. Pl. I fig. 1.)

- 1898 *January*: 7° N. 53° W.  
*March*: 6° S. 4° W.  
*July*: 31° N. 39° W.  
*September*: Azores; 56° N. 12° W.; 57° N. 14° W.; 60° N. 4° W.  
*October*: Azores; 57° N. 27° W.  
*November*: 47° N. 41° W.  
 1899 *April*: 46° N. 13° W.  
*June*: 15° S. 5° W.; 9° N. 25° W.; 27° N. 25° W.  
*July*: 12° N. 27° W.; 33° N. 36° W.; 35°—36° N. 40° W.; 40°—41° N. 38°—37° W.; 48° N. 23°—25° W.  
*August*: 48° N. 17°—20° W.

**Temperature**: 20.6, mean of 26 obs., max. 27, min. 9.

**Salinity**: 36.10, mean of 22 obs., max. 37.50, min. 35.19.

**Plankton-type**: S.

**DIPLOPSALIS LENTICULA BERGH.<sup>1</sup>**

(SCHÜTT: D. Peridineen d. Plankton-exp. Pl. XV fig. 50.)

- 1899 *January*: 16°—21° N. 18°—17° W.; 35° N. 74° W.  
*February*: Caribbean Sea; 34° N. 74° W.  
*March*: 16° N. 18° W.; 27° N. 16° W.; 9° N. 59° W.; Caribbean Sea; 43° N. 48° W.  
*April*: 7°—10° N. 55°—53° W.; 40° N. 41° W. to 48° N. 29° W.; 50° N. 9° W.  
*May*: 28° N. 45°—47° W.; 20° N. 60° W.; 41° N. 60° W. to 50° N. 14° W.  
*June*: 22° N. 60° W.; area between 37° N. 41° W., 48° N. 33° W. and the Engl. Channel.  
*July*: 31° N. 38° W.; 41° N. 58° W.; Azores; Engl. Channel; 59° N. 3° W. to 58° N. 36° W.  
*August*: Caribbean Sea; Azores; 44° N. 43° W. to 40° N. 66° W.; 56° N. 28°—34° W.; S. of Iceland; Färöes; Shetlands.  
*September*: 9° N. 53° W.; 23° N. 42° W.; 26° N. 39° W.; Azores; 40° N. 59° W. to 41° N. 65° W.; 50° N. 11° W. to 49° N. 3° W.; area between 56° N. 36° W., 57° N. 14° W. and the Shetlands; Färöes; 63° N. 27° W.  
*October*: 41° N. 67°—59° W.; 55°—56° N. 39°—29° W.; S. of Iceland to N. of Scotland.  
*November*: 22° N. 53° W.; 22° N. 43° W.; 41° N. 69° W. to 43° N. 58° W.; 56° N. 36°—17° W.; S. of Iceland to the Shetlands.  
*December*: 18° N. 67° W.; 19° N. 58° W.; 25° N. 52° W.; Azores; 41° N. 66° W.; 62° N. 10° W.
- 1899 *January*: 29° N. 16° W. to 34° N. 12° W.  
*February*: 34° N. 40° W.  
*March*: 35° N. 16° W.  
*April*: 9° N. 59° W.; 32°—36° N. 75°—74° W.  
*June*: 11° S. 10° W.; 1° N. 23° W.; 62° N. 2° E.  
*July*: 57° N. 31° W.; 62° N. 0° E.  
*August*: 56° N. 31° W.

<sup>1</sup> Ostenfeld's data used.

*September*: 56° N. 38° W.

*October*: 56° N. 38° W.

**Temperature**: 16.<sub>9</sub>, mean of 159 obs., max. 28, min. 4.

**Salinity**: 35.<sub>67</sub>, mean of 137 obs., max. 37.<sub>14</sub>, min. 32.<sub>20</sub>.

**Plankton-type.** Occurs in the Mediterranean the Pacific and Indian Ocean. It is rare in the Atlantic on the whole S. of 40° N. It occurs between 40° and 50°, across the Atlantic, from May to August, rarely later; between 55° and 60° in July to August, rarely later, and between 60° and 65° from August to November — S.

### GONIODOMA ACUMINATUM STEIN.<sup>1</sup>

(SCHÜTT D. Peridineen d. Plankton-exped. Pl. VIII fig. 30. — The var. *armata* SCHÜTT. not distinguished).

1898 *January*: 13° S. 35° W. to Cape Verde Islands; 7° N. 53° W. to 48° N. 6° W.; 25°—35° N. 74° W.

*February*: 19°—21° N. 52°—50° W.; 30°—31° N. 37°—35° W.; Caribbean Sea; 21° N. 74° W. to 34° N. 73° W.

*March*: 3° N. 16° W.; 7° N. 21° W.; 11° N. 20° W.; area between 10° N. 53° W.; 45° N. 13° W.; 29° N. 45° W.; Caribbean Sea; 28° N. 74° W.

*April*: area between 10° N. 53° W., 14° N. 48° W., 41° N. 20° W. and 30° N. 24° W.; Caribbean Sea; 23° N. 72° W. to 27° N. 75° W.; 48° N. 30° W.

*May*: area between 11° N. 52° W., 16° N. 58° W., 34° N. 40° W. and 32° N. 36° W.; Caribbean Sea; area between 32° N. 36° W., 41° N. 54° W. and 50° N. 14° W.; 60° N. 10° W.

*June*: area between Porto Rico, 37° N. 41° W., 29° N. 36° W. and 23° N. 42° W.; Azores; 60° N. 8° W.

*July*: 21° N. 18° W.; area between 26° N. 48° W., 44° N. 39° W. and 41° N. 17° W.; Caribbean Sea; 25°—33° N. 74° W.; 41° N. 60° W.; 59° N. 21°—13° W.

*August*: Caribbean Sea; 25°—34° N. 74°—73° W.; Azores; 40° N. 66° W. to 49° N. 14° W.

*September*: 8°—12° N. 25°—27° W.; 9° N. 53° W. to 17° N.

<sup>1</sup> Ostenfeld's and Murray's & Whitting's data used.

48° W.; Caribbean Sea; 20°—37° N. 74° W.; 42° N. 57° W.; area between Madeira, the Azores and 26° N. 39° W.; 46° 48' N. 11°—7° W.

*October*: 21° S. 36° W.; 30°—34° N. 74° W.; Azores; 57°—58° N. 27°—25° W.

*November*: area between Rio Janeiro, 24° N. 29° W and 9° S. 34° W.; Cape Verde Islands; 19° N. 58° W.; 26°—29° N. 48°—43° W.; 44° N. 55° W.; 47° N. 41° W.; Azores.

*December*: 14° S. 36° W.; Cape Verde Islands; Canaries; Caribbean Sea; 19° N. 58° W. to 28° N. 47° W.; 34° N. 38° W.

1899 *January*: 29° N. 16° W to 35° N. 9° W

*February*: 32° N. 47° W.

*March*: 24° N. 40° W.; 35° N. 16° W

*April*: 41° N. 18°—15° W.; 28° N. 75° W. to 36° N. 74° W

*June*: 19° S. 1° W. to 9° S. 12° W.; 1° N. 23° W. to 9° N. 25° W.; 18° N. 47° W. to 27° N. 39° W.; 36° N. 30° W.

*July*: 11°—14° N. 26°—28° W.; 23° N. 36° W. to 38° N. 39° W.; 32° N. 41° W

*August*: 48° N. 11°—20° W

*November*: 51° N. 13° W.

**Temperature:** 22.4, mean of 171 obs., max. 28.4, min. 11.

**Salinity:** 35.98, mean of 136 obs., max. 37.68, min. 32.87.

**Plankton-type.** I have seen this species in samples from the Red Sea and the Indian Ocean. SCHRÖDER mentions it from Naples. It occurs in the whole Atlantic, from 35° S. to 60° N. It appears between 40° and 50° N., in the eastern Atlantic, from the winter to September, in the western Atlantic from May to September (maximum in August, when its area of distribution crosses the Atlantic from west to east). It reaches nearly 60° N. from May to October — *D. S.*

### GONIODOMA SPHÆRICUM MURR. & WHITT.<sup>1</sup>

(Trans Linn. Soc. 2 ser. Bot. Vol. V. part. 9 1899 Pl. XXVII f. 3.)

1897 *August*: 33° N. 35°—43° W.

1898 *January*: 35°—34° N. 30°—31° W.

<sup>1</sup> Murray's and Whitting's data used.



*February*: 28°—25° N. 39°—44° W.

*March*: 29°—31° N. 45°—42° W.

*August*: 48° N. 24° W.

**Temperature**: 19.4 (one observation).

**Salinity**: 35.68 (one observation).

**Plankton-type**: *D*.

### GONYAULAX GLYPTORHYNCHUS MURR. & WHITT.<sup>1</sup>

(Trans. Linn. Soc. 2 ser. Bot. Vol. V part 9. 1899 Pl. XXVIII f. 3).

1897 *April*: 21°—18° N. 49°—53° W.

*December*: 24°—25° N. 50°—51° W.

1898 *January*: 34°—32° N. 31°—34° W.

*February*: 30° N. 74° W.

*March*: 14°—16° N. 64°—68° W. and 29°—30° N. 45°—42° W.

**Temperature**: 16.65 to 26.10.

**Plankton-type**: *D*.

### GONYAULAX JOLLIFFEI G. MURRAY & WHITTING.<sup>2</sup>

(Trans. Linn. Soc. London. 2 Ser. Bot. Vol. V part 9. p. 324 Pl. XXVIII f. 1.)

1898 *January*: 32° N. 74° W.

*February*: 28°—27° N. 29°—41° W.; Caribbean Sea.

*March*: 12° N. 51° W. to 9° N. 58° W.; Caribbean Sea; area between 28° N. 38° W., 29° N. 45° W. and 39° N. 32° W.

*April*: 41° N. 20° W. to 17° N. 72° W.

*May*: 30°—32° N. 44°—42° W.; 36°—38° N. 27°—21° W.; 41° N. 51° W.

*June*: 25° N. 57° W.; 33° N. 48° W.

*July*: Caribbean Sea; 26° N. 48° W.; Azores.

*August*: Caribbean Sea; Azores.

*September*: Caribbean Sea; 42° N. 57° W.; Azores.

*October*: 21° S. 36° W.

*December*: 26° S. 45° W.; 14° S. 26° W.; Caribbean Sea.

<sup>1</sup> Murray's and Whitting's data used.

<sup>2</sup> Murray's & Whitting's data used.

1899 *February*: 32° N. 46° W.

*March*: 21°—24° N. 43°—40° W.

*April*: 36° N. 74° W.

*June*: 19°—7° S. 1°—14° W.; 36° N. 30° W.

*July*: 28° N. 40° W.; 43° N. 35° W.

**Temperature**: 23.<sub>2</sub>, mean of 33 obs., max. 28.<sub>1</sub>, min. 17.<sub>2</sub>.

**Salinity**: 36.<sub>17</sub>, mean of 28 obs., max. 37.<sub>41</sub>, min. 34.<sub>72</sub>.

**Plankton-type**. Occurs at Naples (SCHRÖDER) — *D*.

### GONYAULAX POLYGRAMMA STEIN.<sup>1</sup>

(SCHÜTT. D. Peridineen d. Plankton-exped. Pl. VIII fig. 33).

1898 *January*: 9°—10° N. 26°—25° W.; Azores.

*February*: 26°—34° N. 74°—73° W.

*March*: 25° N. 41° W.; 29° N. 45° W. to 44° N. 19°—17° W.

*April*: Caribbean Sea; 19° N. 56° W. to the Azores; 50° N. 12°—9° W.

*May*: Caribbean Sea; 22°—24° N. 53°—51° W.; area between 30° N. 44° W., 34° N. 40° W. and 34° N. 46° W.; area between 44° N. 19° W., 45° N. 43° W. and 50° N. 14° W.; 60° N. 10° W.

*June*: 25°—28° N. 57°—53° W.; 47° N. 17°—33° W. to 50° N. 12° W.; 60° N. 4° W.

*July*: Azores; 40° N. 57° W. 49° N. 27° W.; area between 58° N. 36°—27° W. and 63°—64° N. 10°—23° W.

*August*: Azores; 42° N. 62° W.; 48°—49° N. 23°—14° W.; 60° N. 3° W. to 61° N. 8° W.

*September*: 32° N. 33° W.; Azores; 46°—47° N. 11°—9° W.; Shetlands; N. of Iceland.

*October*: 57° N. 27° W. to 59° N. 21° W.; 60° N. 6° W.

*November*: Azores; 60° N. 4° W.

*December*: 26° S. 45° W.

1899 *March*: Azores.

*April*: 41° N. 18° W.; 44° N. 15° W.

*May*: 51° N. 26° W.

*June*: 9° N. 25° W.; 27° N. 39° W.

<sup>1</sup> Murray's & Whitting's and Ostenfeld's data used.

*July*: 29° N. 41° W.; 45°—48° N. 31°—25° W.; 57° N. 23° and 31° W.

*August*: 48° N. 17° W.

**Temperature**: 17.4, mean of 57 obs., max. 27.1, min. 7.

**Salinity**: 35.70, mean of 47 obs., max. 37.41, min. 33.78.

**Plankton-type**. Occurs in the Mediterranean, Pacific and Indian Ocean. — *S* (and *D*.)

### GONYAULAX SPINIFERA (CLAP & LACHM.).<sup>1</sup>

(STEIN: D. Org. d. Infus. Pl. IV fig. 10—14).

1898 *January*: 37° N. 73° W.

*February*: 34° N. 73° W.

*March*: 51° N. 25° W.

*April*: 59° N. 22° W.

*May*: 57°—60° N. 13°—36° W.; Färöes.

*June*: S. and SE. of Iceland; between Iceland and the Färöes; N. of Scotland; 57° N. 34°—38° W.; 40°—44° N. 9°—10° W.; 44° N. 16° W.

*July*: S. of Iceland; between Iceland and the Färöes; 58° N. 27°—36° W.

*August*: S. coast of Iceland; Färöe Channel; 50° N. 12° W.; 48° N. 23° W.; 55° N. 41° W.; 54° N. 47° W.; 42° N. 62° W.; E. Greenland at 65° N.; W. Greenland, Disco, common.

*September*: SW. of Iceland; Denmark's Sound to E. Greenland at 65° N.; Färöe Channel; 59° N. 1° W.; area between 53° N. 49° W., 56° N. 35° W. and 59° N. 34° W.

*October*: area between 58° N. 35°—48° W. and 54°—55° N. 45°—39° W.; Färöe Channel.

*November*: 53° N. 32° W.; 55°—50° N. 44° W.

*December*: 47° N. 44° W.; 41° N. 66° W.

1899 *January*: 40° N. 69°—66° W.

*May*: 56° N. 1° W.; 60° N. 4° W.; 58° N. 9° E.

*June*: 64° N. 7° E.

*July*: 57° N. 31° W.; 53° N. 42° W., common.

<sup>1</sup> Ostenfeld's data used.

*August*: 54° N. 34° (rare) to 48° W. (common).

*September*: 56° N. 38° W. (rare) to 53° N. 51° W. (common).

*October*: 54° N. 45° W., rare.

*November*: 51° N. 28° W., not rare; 52° N. 48° W., not rare.

**Temperature**: 8.5, mean of 15 obs., max. 12, min. 6.

**Salinity**: 34.80, mean of 15 obs., max. 35.63, min. 32.90.

**Plankton-type**. The principal area of distribution is between Scotland, Iceland and the Newfoundland Banks. SCHRÖDER mentions it from Naples — Ns.

### GYMNASTER PENTASTERIAS (EHB.).

(SCHÜTT: D. Peridinéen d. Plankton-exped. Pl. XXVII. fig. 100.)

1898 *November*: 56° N. 35° W.

1899 *January*: 45° N. 49° W.

**Temperature**: 7.8 to 12.

**Salinity**: 35.00 to 35.54.

**Plankton-type**: S ?.

### HISTIONEIS MAGNIFICA (STEIN).<sup>1</sup>

(*Ornithocercus magnificus* STEIN D. Org. d. Infus. Pl. XXIII fig. 6).

1897 *December*: and

1898 *January*: area between 12° S. 34° W., 20° N. 18° W., the Azores and 10° N. 83° W.; 29°—35° N. 74° W.

*February*: 31° N. 35° W. to 19° N. 52° W.; whole Caribbean Sea; Bahamas to 34° N. 73° W.

*March*: area between 6° S. 4° W, 41° N. 22° W. and 9° N. 59° W.; Caribbean Sea; 28°—32° N. 74° W.

*April*: 41° N. 20° W. to 7° N. 55° W. and 14° N. 58° W.; Caribbean Sea; 31° N. 75° W.

*May*: 43°—44° N. 23°—27° W.; Azores; 42° N. 45° W. to 41° N. 65° W.; area between 32°—33° N. 36°—40° W., 22°—23° N. 53°—45° W. and 11° N. 53° W.; Caribbean Sea;

<sup>1</sup> Murray's and Whitting's data used.

*June*: area between 10° N. 52° W., Madeira, 40° N. 37° W. and Porto Rico.

*July*: area between the Azores, 41° N. 58° W., 33° N. 74° W. and 15° N. 71° W.

*August*: 14° N. 70° W. to 34° N. 73° W.; 40° N. 59° W. to 45° N. 43° W.; Azores.

*September*: S. of Cape Verde Islands; sparingly from 9° N. 53° W. to the Azores; 20°—38° N. 74° W.

*October*: 21° S. 36° W.; Caribbean Sea; 34° N. 74° W.; Azores.

*November*: 26°—24° S. 30°—29° W.; 13° S. 27° W. to 0° S. 32° W.; 18° N. 57° W.; 22° N. 53° W.; 29° N. 43° W.; Azores to 34° N. 10° W.

*December*: 26° S. 45° W.; 18° N. 67° W. to 25° N. 52° W.; 34° N. 38° W.; area between the Azores, Gibraltar and the Canaries.

1899 *January*: area between the Canaries, Madeira and Gibraltar.

*March*: 21°—24° N. 43°—40° W.; 35° N. 16° W.

*April*: 32°—36° N. 75°—74° W.

*May*: 29°—25° S. 9°—7° E.; 36° N. 75° W.

*June*: 17° S. 2° W. to 9° N. 25° W.; 24° N. 41° W.; 27° N. 39° W.

*July*: 11°—12° N. 26°—27° W.; 32° N. 41° W. to 40° N. 38° W.

**Temperature:** 22.<sub>8</sub>, mean of 150 obs., max. 28, min. 17.

**Salinity:** 36.<sub>12</sub>, mean of 120 obs., max. 37.<sub>63</sub>, min. 33.<sub>20</sub>.

**Plankton-type.** This species is one of the most characteristic organisms of the Desmo-plankton. It occurs outside the Atlantic in the Adriatic, Mediterranean, Red Sea, Indian and Pacific. In the Atlantic the area of distribution is the tropical and subtropical region, between Africa and America, at least from 29° S. to the Azores, where it occurs the whole year. The northern limit in the west is during the the winter about 35° N. The northern limit advanced in May beyond 40° N. nearly to 45°, but in September it had retired below 40°, but on the other hand the area of distribution moved in November—January towards the Canaries and Gibraltar. — *D.*

**HISTIONEIS PARA** MURR. & WHITT.<sup>1</sup>

(Frans. Linn. Soc. 2 Ser. Bot. V. part. 9. 1899 Pl. XXXII fig. 4.)

1897 *December*: 24° N. 50°—51° W.1898 *January*: 32°—33° N. 34°—31° W.*February*: 25°—27° N. 44°—41° W.*March*: 24° N. 41° W. to 29°—31° N. 45°—42° W.**Temperature**: 21.5 (one obs.).**Salinity**: 37.22 (one obs.).**Plankton-type**: *D*.**HISTIONEIS SPLENDIDUS** (SCHÜTT).<sup>1</sup>

(Ornithocercus splendidus SCHÜTT D. Peridineen d. Plankton-exped. Pl. V. fig. 23.)

1898 *February*: 31° N. 35° W. to 19° N. 52° W.*March*: 29°—31° N. 45°—42° W.*April*: 27° N. 74° W.*May*: 41° N. 51° W.*July*: 41° N. 58° W.*September*: 41° N. 65° W.*October*: 21° S. 36° W.*November*: 4° N. 30° W.; 34°—36° N. 10°—14° W.; Azores.*December*: Canaries; 22°—25° N. 56°—52° W.; 34° N. 38° W.1899 *January*: 35° N. 9° W.*February*: 32°—34° N. 47°—40° W.*May*: 35° N. 75° W.**Temperature**: 21.5, mean of 24 obs., max. 27.2, min. 16.8.**Salinity**: 36.24, mean of 16 obs., max. 37.21, min. 33.88.**Plankton-type**: *D*.<sup>1</sup> Murray's & Whitting's data used.

**OXYTOXUM CONSTRICTUM** (STEIN).<sup>1</sup>*(Pyrgidium constr.* STEIN. D. Org. d. Infus. Pl. V. fig. 15—18.)1898 *January*: 36° N. 30° W.*February*: 34° N. 31° W. to 27° N. 41° W.*March*: 30° N. 44° W.; 44° N. 21° W.*April*: 29° N. 38° W. to 22° N. 47° W.; 19° N. 52° W. to 16° N. 56° W.*May*: 44° N. 20° W. to 33° N. 42° W.1899 *July*: 28° N. 40° W., very rare.**Temperature**: 21.8, mean of 22 obs., max. 27.2, min. 12.2 (Murray's and Whitting's data).**Salinity**: 37.40 (one obs. only).**Plankton-type**. Noted from the Mediterranean. — *D.***OXYTOXUM CRIBROSUM** STEIN.

(D. Org. d. Infus. Pl. V fig. 4.)

1898 *August*: Azores, very rare.**Temperature**: 21.2.**Salinity**: 36.25.**Plankton-type**: *D.* ?**OXYTOXUM DIPLOCONUS** STEIN.<sup>2</sup>

(SCHÜTT: D. Peridinee d. Plankton-exp. Pl. XVII fig. 54.)

1898 *February*. 27°—28° N. 41°—39° W.*March*: 34°—39° N. 39°—32° W.*April*: 10° N. 53° W.*May*: 45° N. 43° W.*September*: 47° N. 9° W.*October*: 57° N. 27° W. and 61° N. 6° W.*November*: 36° N. 14° W. and 49° N. 12° W.*December*: 50° N. 9° W.<sup>1</sup> Murray's & Whitting's data used.<sup>2</sup> Ostenfeld's and Murray's & Whitting's data used.

1899 *April*: 46° N. 13° W. and 32° N. 75° W.

*July*: 41° N. 37° W.

*November*: 51° N. 13° W., very rare.

**Temperature**: 16.6, mean of 14 obs., max. 24.1, min. 9.5.

**Salinity**: 35.78, mean of 9 obs., max. 36.51, min 35.11.

**Plankton-type**: S.

### OXYTOXUM SCEPTRUM (STEIN.)<sup>1</sup>

(Pyrgidium sc. D. Org. d. Infus. Pl. V fig. 19—21.)

1898 *April*: 36°—32° N. 28°—34° W.; 26°—27° N. 43°—47° W.

*May*: 44°—47° N. 19°—13° W.

*June*: 34° N. 46° W.

**Temperature**: 18.8, mean of 4 obs., max. 23.2, min. 13.6.

**Salinity**: 36.18 (one obs.).

**Plankton-type**. Noted from the Mediterranean. — *D*.

### OXYTOXUM SCOLOPAX (STEIN.)<sup>1</sup>

(SCHÜTT: D. Peridineen d. Plankton-exp. Pl. XVIII fig. 55.)

1898 *January*: 32° N. 34° W.; Azores.

*February*: 19°—21° N. 52°—50° W.; Caribbean Sea; 27°—31° N. 41°—35° W.

*March*: Caribbean Sea; 29° N. 45° W.; 41°—45° N. 21°—19° W.

*April*: 41° N. 20° W. to 16° N. 56° W.

*May*: Caribbean Sea; 16°—20° N. 58°—54° W.; 30° N. 44° W. to 47° N. 13° W.; 45° N. 43° W.; 50° N. 14° W.

*June*: 34° N. 47° W.; 37° N. 26° W.; 48° N. 33° W.; 50° N. 18° W.

*July*: round the Azores; 48° N. 31° W.; 42° N. 51° W.

*August*: across the Atlantic, between 40° and 50° N., from 49° N. 14° W. to 42° N. 62° W.

<sup>1</sup> Murray's & Whitting's data used.



- September*: 47° N. 9° W.  
 1899 *April*: 41° N. 17° W. to 46° N. 13° W.  
*June*: 20° S. 1° E. to 14° S. 6° W.  
*July*: 15° N. 29° W.; 43° N. 35° W.; 48° N. 23° W.  
*November*: 51° N. 34° W.

**Temperature:** 18.7, mean of 31 obs., max. 26.1, min. 10.8.

**Salinity:** 35.69, mean of 26 obs., max. 36.68, min. 32.96.

**Plankton-type.** This species occurs in the Mediterranean, Pacific and Indian Ocean. To judge from my own observations, it is a typical Styli-plankton-form, but MURRAY'S and WHITTING'S data point more to the conclusion that it belongs to the Desmo-plankton. It occurs in the Atlantic at least from 20° S., but scarcely passes beyond 50° N. — S. (D. ?)

### OXYTOXUM TESSELATUM (STEIN).<sup>1</sup>

(SCHÜTT: D. Peridineen d. Plankton-exp. Pl. XVII fig. 52.)

- 1897 *September*: 30° N. 39° W.  
*October*: 28°—31° N. 45°—42° W.  
*November*: 24° N. 45° W.  
*December*: 15°—16° N. 78°—77° W.  
 1898 *January*: 38° N. 25° W. to 32° N. 34° W.  
*February*: 27°—25° N. 41°—44° W. and 21°—19° N. 50°—52° W.  
*March*: 29°—31° N. 45°—42° W. and 34°—39° N. 39°—32° W.  
*August*: 49° N. 20° W.  
 1899 *March*: 46° N. 11° W.  
*July*: 48° N. 25° W.

**Temperature:** 15.5 to 27.20 (exceptionally 12).

**Salinity:** 35.17 to 35.71.

**Plankton-type.** Occurs in the Mediterranean and Indian Ocean.

<sup>1</sup> Murray's & Whitting's data used.

**PERIDINIUM BLACKMANI** MURR. & WHITT.<sup>1</sup>

(Trans. Linn. Soc. London, 2 Ser. Bot. Vol. V part. 9. Pl. XXIX fig. 6, 1899.)

1897 *December*: Caribbean Sea.1898 *January*: 7° N. 54° W.*April*: 16°—22° N. 55°—47° W.*June*: 23° N. 42° W.*July*: 15° N. 71° W.*October*: 30° N. 74° W.*December*: 18° N. 67° W.**Temperature**: 25 to 27.2.**Salinity**: 35.70 to 36.92 (exceptionally 34.88).

**Plankton-type.** This species occurs at all seasons in the western tropical Atlantic, in the Equatorial Current N. of S. America, in the Caribbean Sea and the Antilles Current, from 7° to 30° N. — *D.*

**PERIDINIUM CATENATUM** LEVANDER.

(Acta Soc. p. Fauna &amp; Flora Fennica IX n. 10 1894.)

1899 *July*: 80° N. 16° E.*September*: 73°—80° N. 18°—13° E.**Temperature**: —0.30 to 6.80.**Salinity**: 34.22—34.88 (exceptionally 25.36).

**Plankton-type.** This small and characteristic species occurs in the Baltic (Bay of Finland and at Roslagen). POUCHET (Journ. de l'anatom. et de physiolog. Vol. XIX, 1883. pag. 441 fig. 36) has represented a form the French coast, that seems to be the same as *P. catenatum*, which thus probably occurs so far south. VANHÖFFEN found *P. catenatum* in Davis's Strait (May and September 1893). — *Ng.*

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<sup>1</sup> Murray's and Whitting's data used.

**PERIDINIUM DEPRESSUM** BAIL.<sup>1</sup>

(Smiths. Contrib. 1853 Vol. VII pag. 12 fig. 33, 34. — *Perid. dic. r. obliqua* AURIV.)

- March*: N. of Scotland; S. of Iceland; W. of Norway, 58° N. 6° E.; 41° N. 60° W.
- April*: W. and S. of Iceland; Färöe Channel; 59° N. 28 — 46° W.; 43° N. 52° W.
- May*: S. Iceland to Rockall (maximum at 59°—61° N.), to the Shetlands and E. Scotland; 57°—61° N. 20°—49° W.; 58° N. 5° E. to 65° N. 8° E.; 42° N. 45° W. to 40° N. 72° W.
- June*: SW and S. of Iceland to the Färöes (not rare) and the Shetlands; 62° N. 2° E. to 69° N. 15° E.; 71°—72° N. 21° —23° E.; 57° N. 34—46° W.; 63°—69° N. 55° W.; 40°—44° N. 9° W.
- July*: round Iceland to the Färöes (common), the Shetlands, 64° N. 3° W. and 59° N. 2° E.; 69° N. 13°—14° E.; 60° N. 17° W. to the south of Greenland, where abundant.
- August*: N., S. and E. of Iceland to the Färöes and the S. of the Shetlands (maximum); 62° N. 53° W. to Disco; 80°—81° N. 10°—19° E.
- September*: N. and S. of Iceland; Färöes; Färöe Channel; S. of the Shetlands; between Norway and Spitzbergen; E. Greenland (65° N.); 58° N. 39° W.; SW. of Cape Farewell (maximum) to Disco, along 55° W.
- October*: S. Iceland to the Färöes; 58° N. 47° W. to 62° N. 56° W.
- November*: S. Iceland; Färöes; 47° N. 41° W. to 40° N. 67° W.
- December*: Färöes; 48° N. 40° W. to 43° N. 61° W.
- 1899 *January*: 48° N. 39° W.; 43° N. 57° W.; 40° N. 66° W.
- March*: 66° N. 14° W.
- April*: 36° N. 74° W.
- May*: Färöes, rare; 60° N. 2—3° W.; 62° N. 2° E. to 56° N. 1° E., as a rule common; 48° N. 45° W. (rare) to 47° N. 57° W. (common).
- June*: along the coast of Norway, from 62° N. 2° E. to 70° N. 20° E., thence to Beeren Island, more or less scarce.

<sup>1</sup> Ostenfeld's data used.

*July*: 71° N. 32° E. to 78° N. 53° E., common at 75° N. 49° E.; 51° N. 47° W. to 52° N. 54° W., rare.

*August*: 72° N. 26° E. to 78° N. 47° E., as a rule not rare.

*September*: 79° N. 11° E. to 73° N. 18° E., rare to common; 67° N. 3° W. to 61° N. 1° E., rare; 53° N. 52° W., rare.

*November*: 52° N. 48° W., rare.

**Temperature**: 8.<sub>2</sub>, mean of 15 obs., max. 12, min. 3.<sub>1</sub> (only such samples calculated as contained this species abundantly).

**Salinity**: 34.<sub>33</sub>, mean of 15 obs., max. 35.<sub>36</sub>, min. 32.<sub>27</sub>.

**Plankton-type**. Occurs in the Bering Sea. — *T.* and *Ng.*

### PERIDINIUM DIABOLUS CL.

(K. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. VII fig. 19, 20.)

1898 *January*: 11°–16° N. 20°–18° W.

*March*: 21° N. 18° W.

*May*: 41° N. 51° W.

*June*: 40°–44° N. 9°–10° W.

*September*: Azores.

*May*: 35° N. 75° W.

**Temperature**: 14.<sub>8</sub> to 24.

**Salinity**: 36 to 36.<sub>40</sub>.

**Plankton-type**. This species occurs in the Indian Ocean. It belongs in the Atlantic to the Styli-plankton of the eastern tropical or subtropical region. — *S.*

### PERIDINIUM DIVERGENS EHB.<sup>1</sup>

(SCHÜTT: D. Peridineen d. Plankton-exp. Pl. XIII fig. 43.)

1898 *January*: 8° N. 21° W. to 12° N. 19° W.; 24° N. 40° W.

*February*: Caribbean Sea; 21°–26° N. 74° W.

*March*: 2° N. 24° W. to 18° N. 19° W.; 7° N. 55° W.; Caribbean Sea; 33° N. 32° W.

*April*: 47° N. 40° W.; 59° N. 22° W.; 60° N. 4° W.; 64° N. 23° W.

<sup>1</sup> Ostenfeld's, but not Murray's & Whitting's data used.

- May:* 60° N. 4° W. to 59° N. 23° W.; 63° N. 10° W. to 64° N. 23° W.; 66° N. 9° E.
- June:* 29° N. 36° W.; 44° N. 16° W.; 40—44° N. 10°—9° W.; 57° N. 38° W.; 63° N. 19° W. to 60° N. 4° W.
- July:* Azores; 31° N. 39° W. to 21° N. 58° W., sparingly; 25°—38° N. 74° W.; 41° N. 58° W.; area between 58° N. 33° W., S. Iceland and N. Scotland.
- August:* 30°—38° N. 74°—73° W.; 40°—41° N. 66°—57° W.; area between the Azores, 56° N. 13° W., 45° N. 40° W. and 56° N. 33° W.; area between the Shetlands, 63° N. 10° W. and 63° N. 21° W.; E. Greenland at 65° N.; 78° N. 12° E.
- September:* 8° N. 25° W.; Azores to 26° N. 39° W., sparingly; 46° N. 11° W.; 47° N. 9° W. to 49° N. 3° W.; area between 56° N. 36° W., S. Iceland, the Shetlands and 56° N. 13° W.; 63° N. 27° W. to 65° N. 36° W.; 70° N. 21° E. to 73° N. 19° E.
- October:* Azores; area between 58° N. 32° W., 59° N. 3° W. and 63° N. 16° W.
- November:* 18° S. 31° W.; 29° N. 43° W.; 41° N. 68° W. to 42° N. 64° W.; 56° N. 36°—17° W.; S. Iceland to the Shetlands.
- December:* Caribbean Sea; 19° N. 58° W.; 25° N. 52° W.; 34° N. 38° W.; Azores; Canaries; 41°—43° N. 66°—57° W.; 62° N. 10° W.
- 1899 *January:* 32° N. 16° W.; 35° N. 9° W.
- March:* 10° N. 20° W.; 14° N. 50° W.; 24° N. 40° W.; Azores; 35° N. 16° W.
- April:* area between 37° N. 9° W., 41° N. 17° W. and 46° N. 13° W.; 32° N. 75° W.
- May:* 57° N. 3° E.
- June:* 20° S. 1° E.; 6° S. 16° W.; 21° N. 45° W.; 27° N. 39° W.; Azores; 62° N. 2° E. to 67° N. 11° E.
- July:* 11°—12° N. 26°—27° W.; 38° N. 39° W. to 48° N. 23° W.
- August:* 48° N. 20° W. to 49° N. 11° W.; 55° N. 9° W. to 56° N. 31° W.
- September:* 72° N. 19° E.; 56° N. 17°—33° W.

October: 52° N. 21° W.

November: 51° N. 13° and 28° W.

**Temperature:** 15.4, mean of 77 obs., max. 28, min. 6.5.

**Salinity:** 35.37, mean of 73 obs., max. 37.50, min. 31.69.

**Plankton-type.** The typical *Perid. divergens* occurs in the Mediterranean, the Red Sea, Indian Ocean and in the whole tropical and temperate Atlantic, but is rather rare in the Sargasso Sea and Florida Current. Its principal area of distribution is between the Azores and Iceland to Scotland, whence it enters the North Sea and the Skagerak and follows the coasts of Norway towards Spitzbergen, thus from 20° S. to 78° N. It enters, as a constant, but scarce constituent, the Tripos-plankton of the North Sea. — S. (D).

### PERIDINIUM (DIVERGENS VAR.) ELEGANS CL.

(K. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. VII fig. 15, 16.)

1898 *January:* 12° N. 50° W.; 32° N. 74° W.

*March:* 4° S. 10° W.; 7° N. 17° W.; 9° N. 59° W.

*May:* area between 23° N. 45° W., 29° N. 39° W. and 28° N. 47° W.

*June:* 19° N. 63° W.; 31° N. 50° W.; 29° N. 36° W.

*July:* 21° N. 58° W.; 33° N. 74° W.; 41°—42° N. 58°—48° W.

*August:* Caribbean Sea; 34° N. 73° W.; 40° N. 66° W. to 44° N. 42° W.

*September:* 9° N. 53° W.; 20° N. 74° W.; 41° N. 65° W.

*October:* 21° S. 36° W.; 26° N. 76° W.; 34° N. 74° W.

*November:* 8° N. 28° W.; 26° N. 48° W.; 42° N. 64° W. to 47° N. 41° W.; 36° N. 14° W.; Canaries.

*December:* 18° N. 67° W.

1899 *January:* 34° N. 12° W.

*March:* 21° N. 43° W.

*April:* 36° N. 74° W.

*May:* 35° N. 75° W.

*July:* 11°—12° N. 26°—27° W.

**Temperature:** 23.8, mean of 43 obs., max. 28.3, min. 10.

**Salinity:** 35.81, mean of 40 obs., max. 37.28, min. 32.87.

**Plankton-type.** Occurs in the Indian Ocean. — D.

## PERIDINIUM EXIGUUM CL.

(Kongl. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. VIII fig. 5.)

1899 *August*: Azores, very rare.**Temperature:** 21.<sup>2</sup>.**Salinity:** 36.<sup>25</sup>.**Plankton-type.** My specimens were found in Styli-plankton, contaminated by some Desmo-plankton.PERIDINIUM GLOBULUS STEIN.<sup>1</sup>

(SCHÜTT: D. Peridineen d. Plankton-exp. Pl. XV fig. 48.)

1898 *January*: 11° N. 20° W. to 21° N. 17° W. and the Azores;  
14° N. 49° W.; 29°—35° N. 74° W.*February*: 21°—19° N. 50°—52° W.; Caribbean Sea; 21°—  
34° N. 74°—73° W.*March*: 11°—16° N. 19°—17° W.; Azores to 45° N. 19° W. and  
to 29° N. 45° W.; 10° N. 53° W.; Caribbean Sea; 32° N.  
74° W.*April*: area between 10° N. 53° W., 19° N. 52° W. and 16° N.  
56° W.; Caribbean Sea; 29° N. 38° W. to 41° N. 20° W.*May*: 6° N. 56° W.; Caribbean Sea; 20° N. 60° W. to 22°—  
24° N. 53°—51° W.; 31°—34° N. 44°—40° W.; area be-  
tween 38° N. 21° W., 47° N. 13° W., 49° N. 22° W. and  
41° N. 51° W.; 57° N. 28° W.*June*: 48° N. 33° W.; 60° N. 4° W.*July*: 31° N. 39° W.; Azores; 41°—42° N. 58°—48° W.; 58° N.  
36° W. to 60° N. 23° W. and 59° N. 13° W.*August*: Azores; 49° N. 20° W.; SW of Iceland; 40°—41° N.  
59°—50° W.*September*: Azores; 46° N. 11° W.; area between 60° N. 4°—  
21° W. and 63° N. 25° W., thence across Denmark's Sound  
to E. Greenland, at 65° N. 36° W.*October*: 59° N. 3° W. to 58° N. 32° W.; S. of Iceland.*November*: 5° S. 34° W.; 13° N. 27° W.; 50° N. 20° W.;<sup>2</sup> Murray's & Whitting's and Ostenfeld's data used.

40° N. 67° W.; 43° N. 61° W.; 48° N. 44° W.; S. of Iceland to the Färöes and 60° N. 4° W.

1899 *January*: off Gibraltar; Canaries.

*February*: 32° N. 46° W.

*March*: Azores.

*April*: 42°—44° N. 18°—15° W.

*June*: 5°—15° S. 17°—5° W.

*July*: 11° N. 26° W. to 23° N. 36° W.; area between 38°—40° N. 39°—38° W. and 45° N. 31° W.

*September*: 56° N. 33° W.

*October*: 56° N. 38° W.

**Temperature:** 20.<sub>8</sub>, mean of 69 obs., max. 27.<sub>3</sub>, min. 8.<sub>1</sub>.

**Salinity:** 35.<sub>58</sub>, mean of 50 obs., max. 38.<sub>51</sub>, min. 33.<sub>88</sub>.

**Plankton-type.** I have found this species in samples from the Red Sea. It enters the Atlantic W. of S. Africa, occurs rarely in the Brazil current, in the spring N. of S. America, in the Caribbean Sea and the Florida Current, but is less abundant in the western than in the eastern Atlantic, where it spreads from the Cape Verde Islands towards the Azores. In May—July it occurred between 40° and 50° N., extended in July to 60° N., in August to Iceland and in September to E. Greenland. It has been seen only rarely in the northern and southern parts of the Sargasso Sea — S.

### PERIDINIUM HINDMARCHII MURR. & WHITT.<sup>1</sup>

(Trans Linn. Soc. London 2nd. Ser. Bot. Vol. V part. 9 Pl. XXIX fig. 1.)

1897 *December*: 29° N. 36° W., very rare; 24° N. 50°—51° W.; Caribbean Sea.

1898 *March*: 34°—39° N. 39°—32° W.; Caribbean Sea.

*April*: 22°—19° N. 47°—60° W.; 19°—16° N. 50°—56° W.

**Temperature:** 23.<sub>1</sub>, mean of 12 obs., max. 27.<sub>3</sub>, min. 15.<sub>6</sub>.

**Plankton-type:** *D*.

<sup>1</sup> Murray's & Whitting's data used.



PERIDINIUM MICHAËLIS EHB.<sup>1</sup>

(SCHÜTT: D. Peridinceen d. Plankton-exp. Pl. XIV fig. 46.)

- 1898 *January*: 15°—21° N. 18°—17° W.; 44° N. 17° W.  
*February*: 27° N. 41° W. to 34° N. 31° W. (Murr. & Whitt.).  
*March*: 7° N. 55° W.; Caribbean Sea; 34° N. 39° W. to 34° N. 32° W.; 21° N. 18° W. to 27° N. 16° W.; 42° N. 21° W.  
*April*: 10° N. 53° W.; Caribbean Sea; Azores to 41° N. 21° W.; 44° N. 45° W. to 48° N. 30° W.; area between 29° N. 38° W., 16° N. 56° W. and 26° N. 49° W. (Murr. & Whitt.).  
*May*: 41° N. 65° W. to 50° N. 21° W.; 63° N. 13° W.; 16°—20° N. 58°—54° W. (Murr. & Whitt.); 33°—34° N. 42°—40° W. (Murr. & Whitt.).  
*June*: 31° N. 17° W.; 42° N. 9° W.; Azores; 44° N. 26° W.; 48° N. 33° W.; 60° N. 4° W.; 62° N. 14° W.; Westmanna ö.  
*July*: Azores; 49° N. 22° W.; 40° N. 69°—67° W.; 58° N. 32° W.; 60° N. 23° W.; Färöes; Shetlands.  
*August*: Azores; 48° N. 23° W.; 41° N. 50° W.; Disco, abundantly; 60° N. 23° W.; 66° N. 17° W.; Shetlands.  
*September*: Azores; 44° N. 58° W.; 46° N. 11° W.; Shetlands; Färöes; 63° N. 25° W.; W. Greenland (65°—69° N. 55°—53° W.).  
*October*: Azores; Shetlands.  
*November*: 9° S. 34° W.; 4° N. 30° W.; 13° N. 27° W.; Canaries; Azores; Shetlands; 48° N. 41° W.  
*December*: Azores.
- 1899 *January*: Canaries; 35° N. 9° W.; 48° N. 39° W.; 40° N. 66° W.  
*March*: Azores,  
*April*: area between 41°—42° N. 17°—18° W. and 46° N. 13° W.  
*May*: 50° N. 39°—33° W.; 58° N. 9° W.; 61° N. 5° W.  
*June*: 20° S. 1° E.; 5° S. 17° W.; 1° N. 23° W.  
*July*: 12°—15° N. 27°—29° W.; 38° N. 39° W. to 48° N. 25° W.  
*August*: 48°—49° N. 20°—11° W.

<sup>1</sup> Murray's & Whitting's and Ostenfeld's data used.

*September*: 73° N. 19° E. to Breen Island and the W. of Spitzbergen to 80° N. 13° E.

*November*: 51° N. 13° W.; 52° N. 48° W.

**Temperature**: 16.8, mean of 14 obs., max. 22.2, min. 6.3 (no data relating to a rare occurrence of this species used).

**Salinity**: 35.59, mean of 12 obs., max. 36.17, min. 32.90.

**Plankton-type**. According to my notes and OSTENFELD's data this species is a typical Styliplankton-form with essentially eastern distribution. It has been seen only rarely along the N. coast of S. America and not in the Florida Current. It enters the Atlantic west of S. Africa, spreads from the Cape Verde Islands to the Azores and occurs in May across the Atlantic between 40° and 50° N. It was seen in June between the Shetlands and Iceland, in August at W. Greenland and in September (1899) W. of Spitzbergen. I have never found it in any collection from the Sargasso Sea, but MURRAY & WHITTING mention it from that region. — S.

### PERIDINIUM OCEANICUM VANHÖFFEN.

(D. Flora u. Fauna Grönlands Pl. V. fig. 2. 1897. *P. divergens* var. *obliqua* AURIV.  
1898 *P. divergens* var. SCHÜTT D. Peridineeën d. Plankton-expedition Pl. XIII  
fig. 44.)

1898 *January*: 7° N. 53° W.; 21° N. 17° W.

*March*: 18° N. 18° W. to 25° N. 16° W.; Azores 41°—43° N. 56°—48° W.

*April*: 41° N. 19° W.; 50° N. 9° W.; 42°—44° N. 47°—45° W.; Färöes; 58°—59° N. 22°—50° W.; 62° N. 50° W.

*May*: Azores to 41° N. 16° W.; across the whole Atlantic, between 40°—50° N., from 42° N. 61° W. to 50° N. 14° W.; 58° N. 45° W. to 60° N. 31° W.; 61° N. 20° W.

*June*: 19° N. 63° W.; area between the Azores, Lissabon, Cape Finisterre and 45° N. 26° W.; 42° N. 50° W.; 48° N. 33° W.

*July*: Azores; 42° N. 48° W.; 49° N. 22° W.; 58° N. 44° W. to 60° N. 27° W.; 63° N. 14° W.

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<sup>1</sup> Ostenfeld's data used.

*August*: Azores;  $41^{\circ}$  N.  $50^{\circ}$  W.;  $50^{\circ}$ — $49^{\circ}$  N.  $10^{\circ}$ — $14^{\circ}$  W.;  $55^{\circ}$ — $54^{\circ}$  N.  $41^{\circ}$ — $47^{\circ}$  W.;  $60^{\circ}$  N.  $3^{\circ}$  W. to  $63^{\circ}$  N.  $15^{\circ}$  W.

*September*: Azores;  $56^{\circ}$  N.  $28^{\circ}$  W. to  $55^{\circ}$  N.  $43^{\circ}$  W.; area between the Shetlands,  $60^{\circ}$  N.  $10^{\circ}$  W and  $63^{\circ}$  N.  $7^{\circ}$  W.;  $62^{\circ}$  N.  $21^{\circ}$  W.;  $65^{\circ}$  N.  $36^{\circ}$  W.;  $59^{\circ}$  N.  $34^{\circ}$  W. to  $58^{\circ}$  N.  $39^{\circ}$  W.;  $60^{\circ}$  N.  $55^{\circ}$  W.

*October*: Shetlands to  $63^{\circ}$  N.  $14^{\circ}$  W. and  $60^{\circ}$  N.  $10^{\circ}$  W.;  $59^{\circ}$  N.  $21^{\circ}$  W. to  $58^{\circ}$  N.  $48^{\circ}$  W.

*November*: Shetlands to  $63^{\circ}$  N.  $13^{\circ}$  W.;  $56^{\circ}$  N.  $22^{\circ}$ — $29^{\circ}$  W.;  $52^{\circ}$  N.  $38^{\circ}$  W.;  $53^{\circ}$  N.  $50^{\circ}$  W.;  $42^{\circ}$  N.  $64^{\circ}$  W. to  $40^{\circ}$  N.  $67^{\circ}$  W.

*December*:  $22^{\circ}$  N.  $56^{\circ}$  W.; Azores (common);  $41^{\circ}$  N.  $66^{\circ}$  W. to  $62^{\circ}$  N.  $10^{\circ}$  W. (very rare).

1899 *January*:  $41^{\circ}$  N.  $69^{\circ}$  W.

*February*:  $32^{\circ}$  N.  $47^{\circ}$  W.

*March*:  $46^{\circ}$ — $37^{\circ}$  N.  $29^{\circ}$ — $26^{\circ}$  W.;  $64^{\circ}$  N.  $12^{\circ}$  W.

*April*:  $32^{\circ}$  N.  $75^{\circ}$  W.

*May*:  $50^{\circ}$  N.  $33^{\circ}$ — $39^{\circ}$  W.;  $35^{\circ}$  N.  $75^{\circ}$  W.

*June*:  $21^{\circ}$  N.  $45^{\circ}$  W.

*July*:  $58^{\circ}$  N.  $23^{\circ}$  W.;  $57^{\circ}$  N.  $31^{\circ}$  W.

*August*:  $55^{\circ}$  N.  $26^{\circ}$  W.;  $56^{\circ}$  N.  $38^{\circ}$  W.

*September*:  $56^{\circ}$  N.  $30^{\circ}$  W. to  $54^{\circ}$  N.  $40^{\circ}$  W., as a rule common.

*October*: area between  $56^{\circ}$  N.  $23^{\circ}$ — $38^{\circ}$  W and  $53^{\circ}$  N.  $25^{\circ}$ — $37^{\circ}$  W., common in the west.

*November*:  $51^{\circ}$  N.  $28^{\circ}$  W., not rare.

• **Temperature**: 12.9, mean of 32 obs., max. 22, min. 3. (no observations relating to a rare occurrence considered).

**Salinity**: 35.45, mean of 28 obs., max. 36.25, min. 34.16.

**Plankton-type.** This species occurs in the Red Sea and the Indian Ocean. It is a typical Styliplankton-form, with essentially eastern distribution, occurring only rarely North of S. America, in the Caribbean Sea and the Florida Current. The principal area of distribution is from the Azores northwards, in May between  $40^{\circ}$  and  $50^{\circ}$  N., across the whole Atlantic, in July round the S. end of Greenland, in October from the Shetlands across the Irminger Sea and into Davis's Strait. It appeared in November north and south of the Newfoundland Banks — S.

**PERIDINIUM OVATUM (POUCHET).<sup>1</sup>**

(SCHÜTT. D. Peridineen d. Plankton-exped. Pl. XVI).

1898 *April*: 39° N. 74° W.*May*: 72° N. 13° W.; S. of Iceland; Färöe Channel; N. of Scotland; Shetlands to Norway; 62° N. 4° E. to 66° N. 9° E.; S. of Iceland and N. of Rockall to 28° W.; SW. of Greenland; 50° N. 22° W.*June*: N. and S. of Iceland; 57° N. 34°—38° W.; W. of Greenland, 63°—66° N. 56°—55° W.; 67°—68° N. 10°—13° E.; SW. of Spitzbergen; W. of Portugal, 40°—42° N. 10°—9° W.*July*: N. and S. of Iceland; N. of the Färöes; S. of the Shetlands; 59° N. 21° W. towards Cape Farewell; 78° N. 1° E.—3° W. (deep sea hauls Auriv.).*August*: SW. and S. of Iceland; Färöe Channel; Irish Channel; SW. and N. of Spitzbergen; E. of Greenland (65° N.); 52° N. 55° W.*September*: N. and S. of Iceland; between Iceland, the Färöes and Rockall; S. of the Färöes; 65°—66° N. 36°—31° W.; 56° N. 35° W.; from Cape Farewell to Disco; Beeren Island; Spitzbergen.*October*: S. Iceland to the Färöes; SW. of Cape Farewell.*November*: S. of Iceland; 51° N. 20° W.; 47° N. 41° W. to 45° N. 52° W.*December*: 63° N. 19°—21° W.; 42° N. 49° W. to 43° N. 61° W.1899 *January*: 45° N. 49° W.; 40° N. 66° W.*April*: 46° N. 13° W.*May*: N. and S. of Iceland; between Iceland and the Färöes; 62° N. 7° W. (rare) to 59° N. 2° W. (common) thence to 56° N. 1° W. (very common).*June*: Westmanna ö, rare; 62° N. 1°—2° E., rare; 64° N. 7° E. to 72° N. 19° E. (common to rare), thence to Spitzbergen, 78° N. 12° E., at several points common.*July*: 78°—80° N. 11°—14° E., more or less common; 71° N. 32° E., rare; 71°—72° N. 21°—22° W., rare; 57° N. 31° W.<sup>1</sup> Ostenfeld's data used.

*August*: 71° N. 20°—23° W., rare; 73° N. 31° E. to 76° N. 41° E.

*September*: 61° N. 1° E., rare (haul from 100 m.); 78° N. 12° E. to 74° N. 18° E., rare to common; 51° N. 28° W., rare.

**Temperature**: 6.1, mean of 12 obs., max. 14.8, min. 2.1 (only such samples as contained this species abundantly have been considered).

**Salinity**: 34.06, mean of 11 obs., max. 34.83, min. 32.25.

**Plankton-type**: *T.* (Ns).

### PERIDINIUM PALLIDUM OSTF.<sup>1</sup>

(Iagttagelser over overfladsvandets temperatur, saltholdighed og plankton paa islandske og grønlandske skibsruter i 1898 pag. 60 K. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. VII fig. 21, 22.)

1898 *April*: S. of Iceland; 59° N. 10° W. to 59° N. 22° W.; 39° N. 74° W., not rare.

*May*: S. of Iceland; 59°—61° N. 2°—28° W.

*June*: S. Iceland to Scotland and to the Färöes and the Shetlands; 57° N. 34°—38° W.; 63°—66° N. 56°—55° W.

*July*: S. Iceland to the Färöes and Scotland; 60° N. 17° W. to S. of Cape Farewell.

*August*: round Iceland; Iceland to Scotland and to E. Greenland (65° N.); 62°—66° N. 56°—55° W.; 48° N. 24° W.

*September*: N. and S. of the Färöes; 59° N. 1° W.; S. Iceland to E. Greenland; 59° N. 50° W. to Disco.

*October*: S. of Iceland; W. of the Färöes; 62° N. 56° W.

1899 *June*: 62° N. 2°—1° E., rare; 74° N. 24° E., rare.

*July*: 71° N. 32° E. to 78° N. 53° E., more or less scarce; 51° N. 47° W. to 52° N. 54° W., not rare.

*August*: 71° N. 20° W., rare; 72° N. 26° E., rare; 75° N. 38° E., rare.

*September*: 75° N. 17° E. to 79° N. 11° E., rare; 52° N. 55° W., rare; 56° N. 33° W., rare.

*October*: 53° N. 37° W., rare.

<sup>1</sup> Ostenfeld's data used.

**Temperature:** 8.5, mean of 45 obs., max. 19.4, min. 0.

**Salinity:** 34.87, mean of 45 obs., max. 35.97, min. 32.43.

**Plankton-type.** Arctic species. — *T. (N's)*.

### PERIDINIUM PEDUNCULATUM SCHÜTT.<sup>1</sup>

(D. Peridineen d. Plankton-exp. Pl. XV fig. 48.)

1898 *May*: 58° N. 21° W.

*June*: 60° N. 4° W.

*July*: 31°—34° N. 39°—33° W.; 41° N. 58° W.; 58° N. 27° W.;  
63° N. 14° W.; 60° N. 4° W.

*August*: Azores; 62° N. 18° W.

*September*: 60° N. 26°—4° W.

*October*: 57° N. 27° W. to 60° N. 4° W.

*November*: 45° N. 7° W.; 56° N. 23° W.; 47° N. 41° W. to  
40° N. 67° W.; Färöes.

*December*: 43° N. 57° W.

1899 *April*: 44° N. 15° W.

*July*: 23° N. 36° W.; 40° N. 38° W. to 48° N. 25° W.

*November*: 51° N. 21° W.

**Temperature:** 14.2, mean of 38 obs., max. 25.5, min 7.

**Salinity:** 35.42, mean of 36 obs., max. 37.36, min. 33.88.

**Plankton-type.** Noted from Naples (SCHRÖDER). — *S.*

### PERIDINIUM PELLUCIDUM (BERGH).<sup>1</sup>

SCHÜTT: D. Peridineen d. Plankton-exp. Pl. XIV fig. 45.)

1898 *April*: 43° N. 50° W., common.

*May*: 58°—60° N. 13°—31° W.

*June*: S. Iceland to Scotland; 57° N. 34°—42° W.; 59° N. 51°  
W. to Disco; SE. of Spitzbergen.

*July*: S. Iceland; between Iceland and the Färöes to Scotland;  
59° N. 21° W. to S. of Cape Farewell; 78° N. 7°—3° W.

<sup>1</sup> Ostenfeld's data used.

- August:* SW. and S. of Iceland; Färöes; Shetlands; E. Greenland ( $65^{\circ}$ — $66^{\circ}$  N.); round Spitzbergen, more or less abundant.
- September:* SW. and S. of Iceland;  $60^{\circ}$  N.  $4^{\circ}$ — $26^{\circ}$  W.; Disco; S. of Spitzbergen.
- October:* S. Iceland to NE. Scotland; SW. of Cape Farewell;  $41^{\circ}$  N.  $67^{\circ}$  W.
- November:* S. Iceland to Scotland;  $48^{\circ}$  N.  $49^{\circ}$  W. to  $40^{\circ}$  N.  $67^{\circ}$  W.
- December:*  $47^{\circ}$  N.  $45^{\circ}$  W. to  $43^{\circ}$  N.  $61^{\circ}$  W.;  $29^{\circ}$  N.  $14^{\circ}$  W.
- 1899 *January:*  $40^{\circ}$  N.  $66^{\circ}$  W.;  $43^{\circ}$  N.  $57^{\circ}$  W.
- March:*  $46^{\circ}$  N.  $11^{\circ}$  W.
- June:*  $41^{\circ}$  N.  $17^{\circ}$  W. to  $46^{\circ}$  N.  $13^{\circ}$  W., rare.
- May:* N. of Iceland,  $66^{\circ}$  N.  $20^{\circ}$ — $24^{\circ}$  W.; Färöes, rare, to  $56^{\circ}$  N.  $1^{\circ}$  W., common;  $58^{\circ}$  N.  $9^{\circ}$  W.;  $50^{\circ}$  N.  $33^{\circ}$  W., common.
- June:*  $64^{\circ}$  N.  $7^{\circ}$  E. to  $72^{\circ}$  N.  $18^{\circ}$  E., not rare;  $73^{\circ}$  N.  $18^{\circ}$  E.;  $80^{\circ}$  N.  $16^{\circ}$  E. (common).
- July:*  $74^{\circ}$ — $70^{\circ}$  N.  $20^{\circ}$ — $21^{\circ}$  W., rare;  $72^{\circ}$  N.  $22^{\circ}$  W., common;  $79^{\circ}$  N.  $10^{\circ}$  E. to  $75^{\circ}$  N.  $48^{\circ}$  E., not rare to common;  $48^{\circ}$  N.  $23^{\circ}$  W.; common;  $53^{\circ}$  N.  $51^{\circ}$  W., not rare.
- August:*  $71^{\circ}$  N.  $20^{\circ}$  W., very rare;  $75^{\circ}$ — $76^{\circ}$  N.  $38^{\circ}$ — $41^{\circ}$  E., rare.
- September:*  $74^{\circ}$  N.  $18^{\circ}$  E. to  $81^{\circ}$  N.  $16^{\circ}$  E., as a rule rare;  $52^{\circ}$  N.  $55^{\circ}$  W., rare.
- November:*  $51^{\circ}$  N.  $28^{\circ}$  W., rare.

**Temperature:**  $5.1$ , mean of 12 obs., max.  $18.6$ , min.  $-0.3$  (only such samples as contained this species abundantly considered).

**Salinity:**  $34.82$ , mean of 12 obs., max.  $35.63$ , min.  $32.81$ .

**Plankton-type.** Arctic species; its occurrence at Naples (SCHRÖDER) is therefore very strange. — *T. (Ns)*.

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<sup>1</sup> Ostenfeld's data used.

**PHALACROMA CUNEUS** SCHÜTT.

(D. Peridineen d. Plankton-exp. Pl. III fig. 14.)

1898 *January*: 6° N. 26° W.; 16° N. 48° W.; 35° N. 74° W.*February*: 21° N. 74° W.*March*: Caribbean Sea; 25° N. 41° W.; 37° N. 24° W.; 40° N. 20° W.*April*: Caribbean Sea.*May*: 13° N. 51° W.*June*: 34° N. 32° W.*July*: 20° N. 58° W.; 26° N. 48° W.*August*: Azores.*September*: 33° N. 31° W.; 33° N. 74° W.*October*: Azores.*November*: 13° N. 27° W.; 26° N. 48° W.; 29° N. 19° and 43° W.*December*: 28°—29° N. 17°—14° W.; 28° N. 47° W.1899 *January*: 35° N. 9° W.; 34° N. 12° W.*June*: 3° S. 20° W.*July*: 28° N. 40° W.**Temperature**: 22.7, mean of 28 obs., max. 27.0, min. 13.8.**Salinity**: 36.49, mean of 22 obs., max. 37.43, min. 35.63.**Plankton-type**. Occurs in the Mediterranean and the Indian Ocean. — *D*.**PHALACROMA DORYPHORUM** STEIN.<sup>1</sup>

SCHÜTT: D. Peridineen d. Plankton-exp. Pl. IV fig. 19.)

1897 *December*: 0° N. 31° W. and 9° N. 29° W.; Caribbean Sea; 23°—25° N. 51°—50° W.; 23° N. 42° W.; 29° N. 36° W.; Azores.1898 *January*: 9°—10° N. 26°—25° W.; 7° N. 53° W.; 29°—32° N. 74° W.; Azores to 32° N. 34° W.*February*: 19° N. 52° W. to 31° N. 35° W.; Caribbean Sea.*March*: 10° N. 20° W.; 10° N. 53° W.; Caribbean Sea; 29° N. 45° W. to 34° N. 39° W.; 39° N. 32° W.<sup>1</sup> Murray's & Whiting's data used.



*April*: 12° N. 51° W.; Caribbean Sea; 16° N. 56° W. to 26° N. 43° W.; 39° N. 23° W. to 41° N. 20° W.

*May*: Caribbean Sea; 16° N. 56° W. to 32° N. 42° W.; 38° N. 21° W. to 41° N. 16° W.

*June*: 31° N. 17° W.; 19° N. 63° W.; 48° N. 33° W.

*July*: Caribbean Sea; 29° N. 74° W.; 41° N. 58° W.; 26° N. 48° W. to 36° N. 28° W.; 41° N. 58° W.

*August*: 22°—30° N. 74° W.; 40° N. 67° W. to 40° N. 58° W.

Azores.

*September*: Azores; 41° N. 65° W.; 57° N. 14° W.

*October*: Azores; 42° N. 57° W.

*November*: 8° N. 28° W.; 13° N. 27° W.; 29° N. 19° W.; 34° N. 10° W.; Azores; 48° N. 29° W.

*December*: Azores.

1899 *January*: Canaries; Madeira to 35° N. 9° W.

*March*: Azores.

*June*: 12° S. 9° W.; 9° N. 25° W.; 27° N. 39° W.

*July*: 11°—12° N. 26°—27° W.

**Temperature**: 22, mean of 55 obs., max. 28.2, min. 14.1.

**Salinity**: 35.96, mean of 41 obs., max. 38.18, min. 33.88.

**Plankton-type**. This species occurs in the Mediterranean, the Red Sea, the Indian Ocean and the Pacific. — *D*.

### PHALACROMA HINDMARCHII MURR. & WHITT.

(Trans. Linn. Soc. Lond. 2nd Ser. Bot. Vol. V part. 9 Pl. XXXI fig. 5.<sup>1</sup>)

1897 *December*: 29° N. 36° W.

1898 *February*: 25°—28° N. 44°—39° W.

*March*: 14°—16° N. 64°—68° W.

*April*: 19°—22° N. 52°—47° W.

*July*: 24° N. 54° W.; 29° N. 74° W.

*August*: 25° N. 74° W.; 44° N. 41° W.

*October*: 34° N. 74° W.

*November*: 22° N. 53° W.; 26° N. 48° W.

*December*: 18° N. 67° W.

<sup>1</sup> The punctuation of the membrane is much too coarse on the figure quoted.

1899 *April*: 28° N. 75° W.

*June*: 9° N. 25° W.

**Temperature**: 24.2, mean of 16 obs., max. 28, min. 21.1.

**Salinity**: 36.27, mean of 10 obs., max. 37.43, min. 34.88.

**Plankton-type**: *D*.

### PHALACROMA JOURDANI (GOURRET).

(SCHÜTT: D. Peridineen d. Plankton-exp. Pl. IV fig. 20.)

1898 *June*: 24° N. 58° W.

*August*: 40° N. 67° W. to 44° N. 41° W.

*September*: 43° N. 18° W.; 47° N. 9° W.; 41° N. 65° W.

*December*: 25° N. 52° W.

1899 *January*: 34° N. 12° W.

*March*: 35° N. 16° W.; 21° N. 43° W.

**Temperature**: 25.6, mean of 8 obs., max. 28, min. 15.6.

**Salinity**: 35.77, mean of 7 obs., max. 37.28, min. 34.33.

**Plankton-type**. Occurs in the Mediterranean. — *S?* *D?*

### PHALACROMA MINUTUM CL.

(K. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. VIII fig. 10, 11.)

1899 *July*: 41° N. 57° W.

*August*: 41° N. 62° W.

**Temperature**: 22 to 24.1.

**Salinity**: 33.88 to 36.13.

**Plankton-type**: *D?*

### PHALACROMA OPERCULATUM STEIN.<sup>1</sup>

(D. Org. d. Infusionsth. Pl. XVIII fig. 7—10.

1897 *December* and

1898 *January*: 15° S. 37° W.; 4° N. 29° W.; 12° N. 50° W.; Caribbean Sea; 23° 25° N. 51°—50° W.; 19° N. 45° W. to the Azores.

<sup>1</sup> Murray's & Whitting's data used.

1898 *January*: 15°—17° S. 37°—38° W.; 9°—10° N. 26°—25° W.; 16° N. 18° W.; 25°—35° N. 74° W.; 32° N. 34° W. to the Azores.

*February*: 19° N. 52° W. to 28° N. 39° W.; Caribbean Sea; 30° N. 74° W.

*March*: Caribbean Sea; 18° N. 46° W.; 29° N. 45° W. to 42° N. 22° W.

*April*: area between 10° N. 53° W., 26° N. 43° W. and 19° N. 58° W.; Caribbean Sea; area between 30° N. 22° W., 32° N. 34° W. and 41° N. 20° W.

*May*: Caribbean Sea; 24°—26° N. 51°—52° W. to the Azores and thence to 47° N. 13° W., 41° N. 56° W.

*June*: 27°—30° N. 55°—53° W.; Azores; 31° N. 17° W.

*July*: 26°—29° N. 48°—44° W.; Azores; 41° N. 67° W.

*August*: Azores; 43° N. 53° W. to 44° N. 42° W.

*September*: 33° N. 31° W.; Azores; 29° N. 74° W.; 41°—42° N. 65°—57° W.

*October*: Azores.

*November*: 36° N. 14° W.; Azores.

*December*: 19° N. 58° W.; 24° N. 52° W.; 34° N. 38° W.; Azores.

1899 *January*: 29° N. 16° W.; 34° N. 12° W.; 35° N. 9° W.

*March*: 21° N. 43° W.

*April*: 28° N. 75° W.

*June*: 5° S. 17° W.; 24° N. 42° W.; 27° N. 39° W.

*July*: 12° N. 27° W.

**Temperature**: 22.1, mean of 60 obs., max. 28, min. 16.3.

**Salinity**: 36.23, mean of 42 obs., max. 37.63, min. 32.92.

**Plankton-type**. Occurs in the Mediterranean, the Red Sea and the Indian Ocean. — *D*.

### PHALACROMA RAPA STEIN.<sup>1</sup>

(D. Org. d. Infus. Pl. XIX fig. 5—8. *P. mitra* SCHÜTT D. Peridineen d. Plankton-exp. Pl. IV fig. 18.)

1897 *December*: 12° N. 50° W.; Caribbean Sea; 23° N. 51° W. to 25° N. 50° W.; Azores.

<sup>1</sup> Murray's & Whitting's data for *P. mitra* used.

1898 *January*: 17° S. 38° W.; 8° N. 21° W.; Azores to 33° N. 31° W.

*February*: Caribbean Sea; 21° N. 74° W.

*March*: 11° N. 19° W.; 12° N. 51° W.; Caribbean Sea; 29° N. 15° W. to 34° N. 39° W.; Azores.

*April*: 15° N. 67° W. to 22° N. 47° W.

*May*: Azores; 22° N. 53° W. to 32° N. 42° W.; Caribbean Sea.

*June*: Canaries; 42° N. 50° W.

*July*: 34° N. 33° W.

*August*: 23° N. 74° W.

*September*: Azores; 41° N. 65° W.; 42° N. 57° W.

*October*: Azores.

*November*: 13° N. 27° W.; 34° N. 10° W.; Azores.

*December*: Porto Rico; Azores.

1899 *January*: 34°–35° N. 12°–9° W.

*March*: 35° N. 16° W.; Azores.

*April*: 41°–42° N. 17°–18° W.; 36° N. 74° W.

*June*: 20° S. 1° E. to 14° S. 7° W.; 24° N. 42° W.

*July*: 28° N. 40° W.

**Temperature**: 21.1, mean of 39 obs., max. 27.8, min. 13.4.

**Salinity**: 35.80, mean of 28 obs., max. 37.63, min. 33.44.

**Plankton-type**. Found in the Pacific. — *D.*

### PODOLAMPAS BIPES STEIN.<sup>1</sup>

(SCHÜTT: D. Peridineen d. Plankton-exp. Pl. XIX fig. 19.)

1897 *December*: 39° N. 24° W. to 12° N. 50° W.; 23°–25° N. 51°–50° W.; Caribbean Sea.

1898 *January*: 8°–10° N. 21°–25° W.; 14° N. 49° W.; 25°–32° N. 74° W.; Azores to 32° N. 34° W.

*February*: Caribbean Sea; 21°–34° N. 74°–73° W.; 31° N. 35° W. to 19° N. 51° W.

*March*: 10°–16° N. 20°–18° W.; 9° N. 59° W.; 15° N. 49° W.; Caribbean Sea; 32° N. 74° W.; 30° N. 43° W.

*April*: 7° N. 55° W.; Caribbean Sea; 31° N. 75° W.; 40° N. 20° W. to the Azores; 32° N. 34° W. to 17° N. 72° W.

<sup>1</sup> Murray's & Whitting's data used.

- May*: Caribbean Sea; 16°—20° N. 58°—60° W. to 32° N. 42° W.  
*June*: 10° N. 53° W.; 19° N. 63° W.  
*July*: Caribbean Sea; 40° N. 67° W. to 42° N. 48° W.; Azores; 26° N. 48° W.  
*August*: Caribbean Sea; 25° N. 74° W.; 40° N. 67° W. to 44° N. 42° W.; 48° N. 24° W.  
*September*: 8—9° N. 25°—24° W.; 44° N. 16° W. to 46° N. 11° W.; 41° N. 65° W. to 42° N. 57° W.  
*October*: 42° N. 15° W.  
*November*: 4° N. 30° W. to 24° N. 21° W.; 34°—36° N. 10°—14° W.; 45° N. 7° W.; 42° N. 63° W.  
*December*: Caribbean Sea; Canaries; 43° N. 57° W.  
1899 *January*: 33°—34° N. 15°—12° W.  
*February*: 32° N. 47° W.  
*March*: 24° N. 40° W.; 35° N. 16° W.  
*April*: area between 41° N. 17° W., 42° N. 18° W. and 44° N. 15° W.  
*May*: 35° N. 75° W.  
*June*: 16° S. 3° W. to 9° N. 25° W.; 27° N. 38° W.  
*July*: 11° N. 26° W.; 25° N. 37° W.; 40° N. 38° W. to 48° N. 25° W.  
*September*: 51° N. 13° W.; 53° N. 43° W.

**Temperature**: 23, mean of 82 obs., max. 28, min. 13.

**Salinity**: 35.74, mean of 64 obs., max. 37.50, min 33.20.

**Plankton-type**. Occurs in the Mediterranean, the Red Sea, the Indian Ocean and the Pacific. It belongs to the tropical Atlantic, at least from 16° S., and advances from July to September (maximum in August) beyond 40° N. (isolated specimens beyond 50° N.), in November to the Bay of Biscay. — *D*.

### PODOLAMPAS PALMIPES STEIN.<sup>1</sup>

(SCHÜTT D. Peridinéen d. Plankton-expedition Pl. XVIII fig. 58).

1897 *December*: and •

1898 *January*: 9° N. 25° W. to 16°—21° N. 17°—18° W.; 34°—35° N. 30°—31° W.; Sargasso Sea; Caribbean Sea.

<sup>1</sup> Murray's & Whitting's and Ostenfeld's data used.

- February*: 27° N. 41° W. to 31° N. 35° W.; whole Caribbean Sea; 30° N. 74° W.
- March*: Caribbean Sea; 32° N. 74° W.; 29° N. 45° W. to the Azores; 49° N. 33° W.
- April*: Caribbean Sea; 15°—16° N. 49°—56° W.; 26° N. 43° W. to the Azores.
- May*: Caribbean Sea; 27° N. 49° W. to 34° N. 40° W.; area between the Azores, 45° N. 43° W. and 49° N. 23° W.
- June*: Canaries.
- July*: 31° N. 38° W.; Azores.
- August*: 40° N. 66° W. to 42° N. 48° W.; 48°—49° N. 24°—14° W.; 68° N. 8° W.; 60° N. 30° 30' W.
- September*: 46° N. 11° W.; 57° N. 14° W.; 60° N. 26° W.
- October*: 57° N. 27° W. to 59° N. 21° W.; 60° N. 4°—6° W.
- November*: 49° N. 12° W.; 56° N. 17°—30° W.; 53° N. 50° W.
- December*: 25° N. 52° W.
- 1899 *January*: 35° N. 9° W.; 48° N. 39° W.
- March*: 37° N. 26° W.
- April*: 41°—44° N. 17°—15° W.
- June*: 20° S. 1° E. to 5° S. 17° W.; 9° N. 25° W.
- July*: area between 12° N. 27° W., 43° N. 35° W. and 33° N. 41° W.
- September*: 54° N. 48° W.
- November*: 51° N. 21° W.

**Temperature**: 19.<sub>2</sub>, mean of 51 obs., max. 27.<sub>2</sub>, min. 7.<sub>2</sub>.

**Salinity**: 35.<sub>69</sub>, mean of 37 obs., max. 37.<sub>40</sub>, min. 32.<sub>96</sub>.

**Plankton-type.** This species belongs both to the Styli- and Desmo-plankton. When in May the water with Desmo-plankton expands to the north and becomes mixed with water containing Styli-plankton, the species of the Desmo-plankton, which can stand the lowering of the salinity and the temperature, follow the Styli-plankton towards Iceland and the Färöe Channel, where this species arrives in August and September. This species occurs in the Mediterranean, the Red Sea, Indian and Pacific — *D. S.*

**PROTOCERATIUM RETICULATUM** CLAP. & LACHM.<sup>1</sup>

(SCHÜTT D. Peridineen d. Plankton-exped. Pl. VII fig. 28.)

1898 *January*: 35° N. 74° W.*February*: 26°—34° N. 74° W.*August*: 69° N. 53° W., common.*September*: 60° N. 4° W., rare.*October*: 57° N. 27° W. to 60° N. 6° W., rare.*November*: 42° N. 64° W.; 60°—63° N. 4°—16° W.

**Temperature:** at Disco (where common) 6.3, in the Irminger Sea (where rare) 10.1, mean of 7 obs., max. 11.9, min. 6.5; in the NW. of N. America (rare) 18.9, mean of 4 obs., max. 21°, min. 16.2.

**Salinity:** 32.9, (Disco); 35.36 (Irminger Sea, max. 35.48, min. 35.19).

**Plankton-type.** The absence of this species in the tropical and temperate Atlantic, its abundance off the W. Greenland and its scarcity in the Irminger Sea point to the conclusion that it is an arctic or northern neritic species, that drifts with the southward American Current and into the Irminger Sea. — SCHRÖDER mentions it from Naples. — N's.

**PYROPHACUS HOROLOGIIUM** STEIN.<sup>2</sup>

(D. Org. d. Infus. Pl. XXIV, XXV fig. 1.)

1897 *December* and1898 *January*: 20° N. 18° W. to 16° S. 37° W.; 12°—16° N. 50°—48° W.*February*: 6°—5° S. 10°—0° E.; Caribbean Sea; 21° N. 74° W.*March*: 6° S. 4° W. to 7° N. 17°—22° W.; 23° N. 28° W.; 25° N. 16° W.; 10° N. 53° W. to 18° N. 46° W.; Caribbean Sea.*April*: area between 10° N. 53° W., Barbados, 22° N. 47° W. and 18° N. 46° W.; Azores.*May*: 11° N. 52° W. to 29° N. 39° W.; Azores; 48° N. 33° W.<sup>1</sup> Ostenfeld's data used.<sup>2</sup> Ostenfeld's and Murray's & Whitting's data used.

- June*: area between 10° N. 53° W., 19° N. 63° W., 33° N. 48° W. and 29° N. 36° W.; 42° N. 50° W.; 48° N. 33° W.; 60° N. 4° W.
- July*: Caribbean Sea; 25°–38° N. 74° W.; 41° N. 60° W., 44° N. 39° W.; 31° N. 39° W.
- August*: 22° N. 74° W. to 34° N. 73° W.; 40° N. 67° W. to 42° N. 50° W.; Azores; 61° N. 8° W.
- September*: 12° N. 27° W.; 9° N. 53° W.; 25° N. 74° W.; 47° N. 33° W.; Azores; 59° N. 2° W. to 60° N. 6° W.; 66° N. 18° W.
- October*: 34° N. 74° W.; 58° N. 32° W. to 60° N. 3° W.
- November*: 8° N. 28° W.; Cape Verde Islands; 22° N. 53° W.; 47° N. 41° W.; 60°–61° N. 1°–5° W.
- December*: Caribbean Sea; Canaries.
- 1899 *May*: 35° N. 75° W.
- June*: 20° S. 1° E. to 4° S. 19° W.; 15° N. 50° W.; 21° N. 45° W.
- July*: 11° N. 26° W.; 40° N. 38° W.

**Temperature**: 23.5, mean of 77 obs., max. 28.2, min. 7.

**Salinity**: 35.79, mean of 57 obs., max. 37.05, min. 33.20 (exceptionally 20.27).

**Plankton-type.** Occurs in the Red Sea, the Indian Ocean and the Pacific. It enters the Atlantic W. of S. Africa, advances towards the Cape Verde Islands, follows the Equatorial Current into the Caribbean Sea, the Florida Current and spreads into the Sargasso Sea. It goes in July–August beyond 40° N. and advances thence towards Iceland and the Färöe Channel as well as towards the Azores and the Canaries. In the North Sea it enters the Tripos-plankton. — *D. (S)*.

### STEINIELLA FRAGILIS SCHÜTT.

(D. Peridineen d. Plankton-expedition Pl. VI fig. 26.)

1898 *July*: 39° N. 23° W.



*September*: 47° N. 9° W.

1899 *January*: 29° N. 16° W.

**Temperature**: 16.8 to 21.0.

**Salinity**: 35.75 to 36.52

**Plankton-type**. Found at Naples (SCHRÖDER) S. ?.

### STEINIELLA MITRA SCHÜTT.

(D. Peridineen d. Plankton-exped. Pl. VII. fig. 27).

1897 *December*: 12°—16° N. 50°—48° W

1898 *January*: 29° N. 74° W.

*February*: 26°—34° N. 74° W.

*March*: 11° N. 19° W.; 7°—9° N. 55°—59° W.; 32°—37° N. 74° W.

*April*: 12° N. 51° W.

*May*: 11°—13° N. 52°—51° W.; 26° N. 52° W.

*July*: 39° N. 23° W.; 33° N. 74° W.

*August*: 42° N. 50° W.

*September*: Azores; 38° N. 74° W

*November*: 29° N. 43° W.; 36° N. 14° W.

*December*: 18° N. 67° W.; Azores.

1899 *January*: 29° N. 16° W.; 33° N. 15° W

*February*: 34° N. 40° W.

*June*: 18° N. 47° W.

**Temperature**: 22.2, mean of 27 obs., max. 27, min. 9.18.

**Salinity**: 35.82, max. 37.03, min. 33.20.

**Plankton-type**. This species appears rarely in the Cape Verde region, follows the Equatorial Current to the north of S. America, enters the Caribbean Sea and the Florida Current, in July—August to about 40° N., spreads thence towards the Azores and reaches the Canaries in the winter. It occurs in the Mediterranean.  
— D.

**STEINIELLA PUNCTATA** CL.

Kongl. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. VIII fig. 4.)

1898 *August*: 48 N. 24 W.

**Temperature:** 19.4.

**Salinity:** 35.68.

**Plankton-type:** S.

## Diatomaceæ.

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### ACHNANTHES TÆNIATA GRUN.<sup>1</sup>

(CL. & GRUN. Arct. Diatom. Pl. I fig. 5.)

1898 *May*: 60° N. 4° W. to 57° N. 44° W. (sparingly).

*June*: S. of Iceland, very rare.

1899 *June*: 75° N. 20° E.

**Temperature:** — 0.3.

**Salinity:** 34.<sub>29</sub> (evidently too high).

**Plankton-type.** Noted from Hudson Bay and the shores of the Arctic Seas, the Baltic (at Bornholm, in the Bay of Finland and at Åland, always in the spring). — *Ny.*

### AMPHIPRORA HYPERBOREA GRUN.

(*A. paludosa* c.? *hyp.* GRUN. CL. & GRUN. Arct. Diat. Pl. IV f. 85. VANHÖFFEN Grönl.-Expedition 1891—93. Pl. III fig. 15.)

1899 *June*: 75° N. 20° E.

*July*: 74°—75° N. 20°—18° W

**Temperature:** — 0.4, mean of 3 obs., max. — 0.3, min. — 0.6.

**Salinity:** 32.<sub>35</sub>, mean of 3 obs., max. 34.<sub>29</sub>, min. 29.<sub>95</sub>.

**Plankton-type.** Noted from E. and W. Greenland, Spitzbergen and Kara Sea. — *Ny.*

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<sup>1</sup> Ostenfeld's data used.

**ASTERIONELLA JAPONICA** CL.<sup>1</sup>

(*A. spathulifera* CL. Öfvers. af K. Sv. Vet. Akad. Förh. 1897 n. 3 pag. 101.  
*A. glacialis* (Castrac.)

1898 *April to July*: more or less abundant along the south coast of Iceland and at Westmannaö.

1899 *May to June*: Westmannaö.

**Temperature**: 8.6, mean of 16 obs., max. 10.3, min. 5.

**Salinity**: 34.69, mean of 16 obs., max. 35.41, min 33.99, exceptionally 26.51.

**Plankton-type**. Noted from the Antarctic regions (*A. glacialis* (Castr.)), from Japan, the Hebrides, western and southern North Sea, Plymouth. — *Nt*.

**ASTERIONELLA NOTATA** GRUN.

(VAN HEURCK Syn. Pl. LIH fig. 3.)

1898 *June to August*: Azores.

*December*: 18° N. 67° W.

**Temperature**. 22.8, mean of 4 obs., max. 26.8, min. 19.4.

**Salinity**: 34.88 and 36.25.

**Plankton-type**. GRUNOW mentions this species from Honduras, Barbados and the Adriatic, SCHRÖDER from Naples. Seems to be a neritic form of the tropical Atlantic. — *Nt*.

**ASTEROLAMPRA MARYLANDICA** EHB.

(Grev. Trans. M. Soc. Vol. VIII 1860 Pl. III fig. 2—4.)

1898 *February*: 15°—16° N. 71° W.; 21° N. 74° W.

*March*: 10° N. 53° W.

*May*: 29° N. 39° W.,

*June*: 10° N. 53° W.

*August*: 22° N. 74° W.

*September*: 9° N. 53° W.

*November*: 26° N. 48° W.

<sup>1</sup> Ostenfeld's data used.

- December*: 18° N. 67° W.; 34° N. 38° W  
 1899 *March*: 18° N. 45° W.  
*April*: 36° N. 74° W  
*June*: 18° N. 47° W.; 21° N. 45° W

**Temperature.** 24.4, mean of 15 obs., max. 28, min. 19.2.

**Salinity:** 36.19, mean of 11 obs., max. 37.43, min. 34.01.

**Plankton-type.** This species is confined to the tropical Atlantic, west of 38° W., northern limit 36° N. It occurs in the Red Sea and the Indian Ocean. — *D.*

### ASTEROLAMPRA ROTULA (GREV.)

(Trans. Mic. Soc. Vol. VIII 1860 Pl. III fig. 5.)

- 1897 *December* and  
 1898 *January*: 39° N. 24° W. to 34° N. 30° W.; 12° N. 50° W.;  
 25°—35° N. 74° W  
*February*: 13°—16° N. 70°—71° W.; 21°—34° N. 74°—73° W  
*March*: 33° N. 32° W.; 10° N. 53° W.; 32° N. 74° W.  
*May*: area between 17° N. 50° W., 20° N. 60° W., 28° N.  
 45° W. and 29° N. 39° W.  
*June*: 28°—30° N. 53°—52° W  
*July*: 26° N. 48° W.; 21° N. 58° W.; 15° N. 71° W.; 29° N.  
 74° W.  
*August*: 22°—25° N. 74° W.  
*September*: 30° N. 74° W.  
*October*: 21° S. 36° W.; 26° N. 76° W.  
*November*: 19° S. 31° W.; 32° N. 38° W.; 29° N. 43° W.  
*December*: 14° S. 36° W.; 18° N. 67° W.; 25° N. 52° W.

**Temperature:** 27.0, mean of 34 obs., max. 28, min. 16.5.

**Salinity:** 36.58, mean of 22 obs., max. 37.41, min. 34.88.

**Plankton-type.** Occurs chiefly in the tropical, western Atlantic; northern limit 33°—34° N. Outside the Atlantic in the Indian Ocean. — *D.*

**ASTEROMPHALUS HOOKERI** EHB.

(*A. atlanticus* CL. Kongl. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 pag. 19  
Pl. VIII fig. 7-9.)

1898 *February*: 60° — 61° N. 3° — 5° W.

*June*: 65° N. 31° W.

*July*: 78° N. 3° W. (deep sea haul).

**Temperature**: 5.0, mean of 8 obs., max. 7.5, min. 3.0.

**Salinity**: 34.49, mean of 7 obs., max. 35.53, min. 33.17.

**Plankton-type**. Noted from the northern Atlantic, usually in *Tricho-* or *Chaeto*-plankton. It was not very rare in 1896 west of Spitzbergen, but extremely rare in 1898 and 1899. — *T*.

*Remark*. This species occurs abundantly in the southern Atlantic and southern Indian Ocean. It is perhaps a variety of *A. Brookvi* (Grev. T. Mic. Soc. Vol. VIII 1860 Pl. IV fig. 18), which has been found in soundings from Kamtschatka.

**ASTEROMPHALUS HEPTACTIS** RALFS.<sup>1</sup>

(A. Schm. Atl. Pl. XXXVIII fig. 5-8.)

1898 *March*: area between 44° N. 17° W., 49° N. 18° W., 55° N. 12° W. and 45° N. 13° W.; 63° N. 2° E.

*April*: area between 39° N. 24° W., 50° N. 9° W and 49° N. 23° W.; 62° N. 2° E.

*May*: 50° N. 22° W.

*July*: 40° N. 58° and 67° W.

*August*: 60° N. 3° W.

*September*: 59° N. 2° W.

*October*: 59° N. 1° W.

*November*: area between 56° N. 36° W., 55° N. 21° W. and 56° N. 23° W.; 9° S. 34° W.

*December*: 26° S. 45° W.

1899 *April*: 46° N. 13° W.

*November*: 51° N. 13° W.

**Temperature**: 13.6, mean of 21 obs., max. 28, min. 7.8.

**Salinity**: 35.35, mean of 19 obs., max. 37.41, min. 33.88.

**Plankton-type**: S.

<sup>1</sup> Ostenfeld's data not used.

**BACTERIASTRUM DELICATULUM CL.<sup>1</sup>**

(Fifteenth annual report of the Fishery Board for Scotland, for the year 1896,  
pag. 298 fig. 15.)

1898 *January*: 35° N. 74° W.

*February*: Caribbean Sea; 34° N. 73° W.

*March*: area between the Azores, 45° N. 13° W., 48° N. 18° W. and 45° N. 40° W.; 41° N. 66° W.

*April*: 39° N. 24° W. to the Engl. Channel and thence along 49° N. to 29° W.; 42° N. 47° W.

*May*: 50° N. 14° W.; from 57° N. 25° W. to 60° N. 9° W.

*June*: 60°—62° N. 4° W.—2° 30' E.

*July*: between 58° N. 33° W., 60° N. 23° W. and 59° N. 15° W. From 41° N. 60° W. to 40° N. 69° W.

*August*: Azores (common); from 63° N. 25° W. to 65° N. 33° W.; 41° N. 65° W.

*September*: SW of Iceland, Denmark's Sound, Färöe Channel.

*October*: between 60° N. 4° W. and 59° N. 16° W.

*November*: Azores; S. and S. E. of Iceland.

*December*: Färöes.

1899 *April*: 46°—48° N. 13° 9° W.

*June*: 62° N. 1° E.

*October*: 53° N. 31° W.

**Temperature**: 14.7, mean of 35 obs., max. 26.8, min. 9.

**Salinity**: 35.22, mean of 27 obs., max. 36.25, min. 31.81.

**Plankton-type.** This species appeared in January and February in the tropical western Atlantic and in March simultaneously between the Azores and the British Islands and east of New York. In May it had advanced towards the Färöe Channel and reached in June mid-way to Norway, in August to Iceland and Denmark's Sound. It occurs in the Red Sea. — S. (typical).

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<sup>1</sup> Ostenfeld's data used.

**BACTERIASTRUM ELONGATUM** CL.

(A Treatise on the Phyto-plankton Pl. I fig. 19.)

1898 *January*: 7' N. 53' W.*March*: area between 30' N. 35' W., 45° N. 13° W., 49' N. 22' W and 43' N. 41° W.; 41° N. 66' W.*April*: area between 39' N. 24' W., 48° N. 33° W. and 48'—50' N. 8°—9' W.*May*: between 48' N. 30' W and 50' N. 14' W.*June*: 62° N. 2' 30' E.*July*: from 40' N. 67' W. to 42' N. 48' W.*August*: 40° N. 59° W.; Azores.*November*: 56° N. 23' W.; Azores.**Temperature**: 16.8, mean of 24 obs., max. 28, min. 9.8.**Salinity**: 34.91, mean of 23 obs., max. 36.25, min. 33.76.**Plankton-type.** Occurs in the Indian Ocean, the Bay of Bengal and, according to SCHRÖDER, at Naples. — S.**BACTERIASTRUM HYALINUM** LAUDER.

(Trans. Mic. Soc. 1864 Vol. XII Pl. III fig. 7.)

1897 *December*: 12° N. 50° W.1898 *January*: 12°—16° N. 19°—18° W*February*: 13°—16° N. 70°—71° W.**Temperature**: 27.7, mean of 5 obs., max. 26.5, min. 20.**Temperature.** Noted from Hongkong and seems to be a tropical, neritic form. — N.



**BACTERIASTRUM VARIANS** LAUDER.

(VAN HEURCK Synops. Pl. LXXX fig. 3—8.)

- 1898 *January*: 7° N. 54° W.  
*May*: 58° N. 15° W.; 7° N. 54° W.  
*September*: 9° N. 53° W.  
*November*: 50° N. 20° W.; 56° N. 30° W.; 40°—42° N. 67°—63° W.
- 1899 *March*: 35° N. 16° W.; 35° N. 29° W.; 46°—47° N. 8°—11° W.  
*April*: 44°—46° N. 15°—13° W.; 32° N. 75° W.  
*October*: 53° N. 31° W.

**Temperature**: 9.6 to 28.**Salinity**: 32.62 to 36.83.

**Plankton-type.** Noted from the coasts of warmer seas, from the southern coast of the North Sea and the Engl. Channel. — *Nm.*

**BIDDULPHIA AURITA** (LYNGB.)

(VAN HEURCK Syn. Pl. XCVIII fig. 4—9.)

- 1898 *March*: 52° N. 6° E.; Färöes.  
*April*: 63° N. 18° W.; Westmannaö.  
*May*: Westmannaö; 72° N. 16° W.
- 1899 *February*: Färöes.  
*March*: Färöes; 65° N. 24° W.; 66° N. 20°—24° W.  
*April*: Färöes; Westmannaö.  
*June*: 75° N. 20° E.

**Temperature**: 4.4, mean of 16 obs., max. 9.8, min. — 1.2.

**Salinity**: 34.55, mean of 15 obs., max. 35.56, min. 33.46; exceptionally 26.5.

**Plankton-type.** Decidedly arctic species. It occurs in Hudson Bay and, according to LEMNERMANN, in the northern Pacific. — *T.*, *Ns.*

**BIDDULPHIA CHINENSIS** GREY.

(T. Micr. Soc. Vol. XIV, 1866 Pl. IX fig. 16.)

1898 *March*: 7° N. 55° W.*June*: 10° N. 53° W.**Temperature**: 26.<sub>9</sub> to 27.<sub>2</sub>.**Salinity**: 36.<sub>01</sub>.**Plankton-type.** Occurs in the Gulf of Bengal, at Java, Hongkong, Jedo Bay (Japan). Tropical neritic form — *Nr*.**BIDDULPHIA MOBILENSIS** (BAIL).

(VAN HEURCK Syn. Pl. CI fig. 4—6.

1898 *January*: 21° N. 17° W.; 48° N. 6° W.*March*: 49° N. 2° W.; 62° N. 2° E.*April*: 60° N. 4°—2° W.*August*: Azores; 55° N. 5° W.*October*: Azores; 42° N. 50° W.*November*: 60° N. 4° W.1899 *April*: 49° N. 7° W.**Temperature**: 14.<sub>4</sub>, mean of 9 obs., max. 23.<sub>7</sub>, min. 6.**Salinity**: 34.<sub>94</sub>, mean of 7 obs., max. 36.<sub>25</sub>, min. 32.<sub>51</sub>.**Plankton-type.** This species is evidently a neritic form, which occurs only exceptionally in the oceans. It abounds round the British Islands. SCHRÖDER mentions it from Naples. — *Nm*.**CERATAULINA BERGONII** H. PERAGOLLO.<sup>1</sup>

(Diatomiste Pl. XIII fig. 15, 16. — CL. Bih. Kongl. Sv. Vetensk. Akad. Handl. Vol. XX 3. Pl. I. fig. 6.)

1898 *January*: 7° N. 53° W.*March*: 7° N. 55° W.; 36° N. 29° W.; 45° N. 36° W.; 43° N. 49° W.*April*: 47°—48° N. 40°—33° W.<sup>1</sup> Ostenfeld's data used.

*May*: area between  $58^{\circ}$  N.  $21^{\circ}$  W.,  $61^{\circ}$  N.  $28^{\circ}$  W., Westman-naö, Färöes and the Shetlands.

*June*:  $62^{\circ}$  N.  $2^{\circ} 30'$  E.

*July*:  $61^{\circ}$  N.  $1^{\circ}$  W.

*August*: Azores;  $62^{\circ}$ — $61^{\circ}$  N.  $6^{\circ}$ — $10^{\circ}$  W.;  $63^{\circ}$ — $64^{\circ}$  N.  $25^{\circ}$ — $27^{\circ}$  W.

*September*:  $63^{\circ}$  N.  $25^{\circ}$  W.

*October*: between  $61^{\circ}$  N.  $5^{\circ}$  W. and  $63^{\circ}$  N.  $12^{\circ}$  W.

*November*:  $45^{\circ}$  N.  $50^{\circ}$  W.;  $42^{\circ}$  N.  $64^{\circ}$  W.

1899 *February*:  $34^{\circ}$  N.  $40^{\circ}$  W.; Färöes.

*April*: Färöes.

*May*:  $58^{\circ}$  N.  $2^{\circ}$  W.;  $58^{\circ}$  N.  $3^{\circ}$  E.

*September*: W. of Spitzbergen, from  $80^{\circ}$  N.  $13^{\circ}$  E. to  $75^{\circ}$  N.  $17^{\circ}$  E.

**Temperature**: 11.3, mean of 28 obs., max. 26.4, min. 3.34.

**Salinity**: 34.88, mean of 24 obs., max. 36.85, min. 32.58.

**Plankton-type**. Noted from the Mediterranean. — *S* (or *Nm*).

### CHÆTOCEROS ATLANTICUS CL.<sup>1</sup>

(Bih. Kongl. Sv. Vetensk. Akad. Handl. Vol. I n. 13 Pl. II fig. 8, 1873).

1898 *January*:  $37^{\circ}$  N.  $73^{\circ}$  W.;  $63^{\circ}$  N.  $19^{\circ}$  W.

*February*:  $38^{\circ}$  N.  $73^{\circ}$  W.;  $50^{\circ}$  N.  $10^{\circ}$  W.;  $60^{\circ}$  N.  $3^{\circ}$  W.

*March*:  $43^{\circ}$  N.  $45^{\circ}$  W. to  $40^{\circ}$  N.  $71^{\circ}$  W.;  $49^{\circ}$  N.  $18^{\circ}$  W.; W. and S. of Iceland ( $64^{\circ}$  N.  $25^{\circ}$  W.;  $61^{\circ}$  N.  $23^{\circ}$  W.); W. of the Färöes to the Shetlands.

*April*:  $43^{\circ}$  N.  $50^{\circ}$  W. to  $40^{\circ}$  N.  $70^{\circ}$  W.;  $62^{\circ}$  N.  $50^{\circ}$  W.;  $48^{\circ}$  N.  $8^{\circ}$  W. — Abundant at  $75^{\circ}$ — $74^{\circ}$  N.  $9^{\circ}$ — $5^{\circ}$  W., thence less abundant to  $73^{\circ}$  N.  $5^{\circ}$  W.

*May*:  $59^{\circ}$  N.  $49^{\circ}$  W.; very abundant from  $77^{\circ}$  N.  $2^{\circ}$  W. to  $70^{\circ}$  N.  $15^{\circ}$  W.;  $68^{\circ}$  N.  $17^{\circ}$  W.; Färöes to  $59^{\circ}$  N.  $10^{\circ}$  W.;  $58^{\circ}$  N.  $23^{\circ}$ — $35^{\circ}$  W.

*June*:  $63^{\circ}$  N.  $56^{\circ}$  W.;  $66^{\circ}$  N.  $55^{\circ}$  W.;  $68^{\circ}$  N.  $13^{\circ}$  E.;  $74^{\circ}$  N.  $23^{\circ}$  E.; Denmark's Sound; NW. and S. of Iceland; SW. of

<sup>1</sup> Ostenfeld's data used.

the Färöes; W. of the Shetlands to 62° N. 2° 30' E.; 57° N. 34° W.

*July*: 63° N. 14° W.; 61° N. 8° W.; Färöes; 60° N. 23° W.

*August*: 69° N. 53° W.; 65° N. 33° W.; Färöes; Färöe Channel; 77° N. 9° E. to 78° N. 12° E., everywhere rare.

*September*: 59° N. 50° W. to 65° N. 55° W.; round Iceland; from the Färöes to the Shetlands; between Spitzbergen and Beeren Island, everywhere rare.

*October*: S. of Iceland; Färöes; N. of Scotland; SW. of the Shetlands; N.N.W. of Rockall.

*November*: S. of Iceland to the Färöes and the Shetlands; 45° N. 50° W.; 56° N. 30° W.; 51° N. 20° W.

*December*: Färöes; rare between 41° N. 66° W. and 47° N. 45° W.

1899 *January*: 43° N. 57° W. to 41° N. 69° W.; Färöes.

*February*: Färöes.

*March*: 66° N. 25° W.; 65° N. 13° W. to 62° N. 8° W.

*April*: Westmannaö; Färöes.

*May*: Färöes; Shetlands; 62° N. 2° E.; 58° N. 8° E.; 51° N. 26° W.; 48° N. 45° W. to 47° N. 57° W.

*June*: 73° N. 4°—6° W.; Jan Mayen; from 67° N. 3° W. to 62° N. 1° E.; 64° N. 7° E.; from 72° N. 19° E. to 77° N. 14° E.

*July*: 74° N. 20° W.; 79° N. 10° E.; 74° N. 41° E.; 53° N. 51° W.; 52° N. 54° W.; 51° N. 47° W.

*August*: 75° N. 38° E.

**Temperature**: 5.1, mean of 35 obs., max. 16, min. — 1.2. Only such samples considered as contained this species abundantly.

**Salinity**: 34.69, mean of 35 obs., max. 35.46, min. 32.01.

**Plankton-type**. Occurs in the Bering Sea. — *T.*

CHÆTOCEROS BOREALIS BAIL.<sup>1</sup>

(CL. A Treatise on the Phyto-plankton Pl. I fig. 2.)

1898 *March*: 47° N. 27° W.; 42° N. 42° W.; 41° N. 66° W. to 40° N. 72° W.

*April*: 74° N. 5° W.; 60° N. 2° W.; 43° N. 50° W. to 40° N. 70° W.; 39° N. 24° W.

*May*: 73° N. 10°—13° W.; area between the Färöes, 59° N. 1° W. and 62° N. 2° E.; 48°—49° N. 30°—23° W.

*June*: 74° N. 23° E.; 62° N. 2° E.; Färöes.

*July*: Färöes; 59° N. 2° W.

*August*: round Spitzbergen: 77° N. 12° E., 80° N. 11° E. to 81° N. 24° E., 79° N. 33°—34° E.; Färöes; 59° N. 2° W.

*September*: 76° N. 13° E.; 75° N. 17° E.; 66° N. 18° W.; 60° N. 2° W.

*November*: Färöes.

1899 *March*: 62° N. 8° W.

*May*: 58° N. 3° E. to 61° N. 1° E.

*June*: 73° N. 18° E. to 72° N. 19° E.; area between 67° N. 3° W., 62° N. 1° E. and 64° N. 7° E. (very abundant).

*July*: 79°—80° N. 10°—14° E.; 70°—74° N. 21°—20° W.; 62° N. 0° W.; 52° N. 54° W.;

*August*: 73° N. 25° W.

*September*: 77° N. 14° E.

*October*: 43° N. 31° W.

**Temperature:** 4.3, mean of 19 obs., max. 9.9, min. —0.9.

**Salinity:** 34.36, mean of 19 obs., max. 35.51 min. 32.81.<sup>2</sup>

**Plankton-type:** typical arctic form. Nevertheless it occurs, according to SCHRÖDER, at Naples. — *T.*

<sup>1</sup> Ostenfeld's data not used.

<sup>2</sup> The above means relate to samples in which this species was common or at least not rare.

**CHÆTOCEROS BOTTNICUS** CL.

(Bih. Kongl. Sv. Vetensk. Akad. Handl. Vol. XXI, 4. n. 8 pag. 14 Pl. 1,

1898 *May*: 72° N. 13' W.1899 *May*: 75° N. 2' 30' E.,*July*: 74° N. 20' W.**Temperature**: —0.1 to —1.**Salinity**: 29.95 to 34.33,**Plankton-type**. This species is evidently an arctic neritic form, only occasionally occurring in the oceans. It is common in the whole Baltic. — *Ng*.**CHÆTOCEROS (BOREALIS VAR.) BRIGHTWELLII** CL.

(CL. a Treatise on the Phyto-plankton Pl. I fig. 2.)

1898 *March*: 58° N. 6° E.; 41° N. 60' W.*April*: 41° N. 58' W.*June*: 68° N. 13' E.; 65° N. 29' W.*September*: 73° N. 19' E. to 76° N. 13° E.1899 *May*: 61° N. 1° E.*June*: 62° N. 2' E.; 72°—73° N. 19'—18° E.*July*: 74°—71° N. 20°—21° W.*August*: 73° N. 25° W.**Temperature**: 8.6, mean of 12 obs., max. 16, min. 5.61.**Salinity**: 35.00, mean of 12 obs., max. 35.54, min. 34.33.**Plankton-type**. This species occurs usually associated with Tricho- and Chæto-plankton, but was remarkably scarce in 1898 and 1899. SCHRÖDER mentions it from Naples. — *T*.**CHÆTOCEROS CINCTUS** GRAN.<sup>1</sup>

(Den Norske Nordhavsexped. 1876—78 Diat. etc. Pl. II fig. 23—27.)

1898 *May*: Shetlands; Orkneys.*June*: 60° N. 4°—8° W., very rare; 63° N. 13° W., rare; 63° N. 18° W., not rare; S. of Iceland, common.<sup>1</sup> Ostenfeld's data used.

*July*: S. of Iceland, common.

*August*: SW. of Iceland; 65° N. 36° W., common; 60° N. 3° W.

*September*: 63° N. 25° W., rare.

**Temperature**: 9.1, mean of 17 obs., max. 11.8, min. 2.2 (common).

**Salinity**: 35.09, mean of 17 obs., max. 35.91, min. 31.80 (common).

**Plankton-type**. This species seems to be an inhabitant of the fjords in the south Iceland, from where it becomes drifted towards the Orkneys and the Shetlands and on the other side towards Greenland. I have noted this species in samples from Puget's Sound. — Ns.

### CHÆTOCEROS CONSTRICTUS GRAN.<sup>1</sup>

(Den Norske Nordhavs Exped. 1876—78, Diat. Pl. I fig. 11—13 Pl. III fig. 42.)

1898 *March*: 41° N. 60°—70° W. (common); 58° N. 6° E. (common).

*April*: 40° N. 70° W.; 39° N. 24° W.

*May*: 59° N. 9° W. to the Shetlands (not rare); 61° N. 0° 47'—1° 30' W. (common); Färöes (rare).

*June*: S. of Iceland (rare); Färöes (rare).

*July*: Westmannaö (not rare); Färöes (rare).

*August*: Färöes (rare); N. of the Orkneys (not rare).

*September*: Westmannaö (very rare).

*October*: Färöes (rare).

*November*: 45° N. 52° W. (not rare),

*December*: 42° N. 49° W. to 41° N. 66° W. (not rare).

1899 *April*: Färöes.

*May*: Färöes; 61° N. 6° W.; 58° N. 7° E. (very common).

*June*: 61° N. 1° E.

**Temperature**: 8.8, mean of 15 obs., max. 12, min. 5.

**Salinity**: 34.02, mean of 15 obs., max. 35.94, min. 32.89 (common).

<sup>1</sup> Ostenfeld's data used.

**Plankton-type.** I have found this species in plankton from Jedo Bay, Japan. It seems to inhabit the fjords on the south side of Iceland and the region of the Newfoundland Banks. It occurs only occasionally in the ocean. Common in the Skagerak (winter). — Ns.

### CHÆTOCEROS CONTORTUS SCHÜTT.

(Ber. d. Deutsch. Bot. Gesellsch. Vol. XIII, 1895. Pag. 42.)

- 1898 *March*: 58° N. 6° E. (common); 7° N. 55° W.  
*April*: 39° N. 24° W.  
*May*: 49° N. 26° W.  
*June*: 64° N. 22° W. to 63° N. 13° W.; 10° N. 53° W.  
 (abundant).  
*July*: 65° N. 14° W.  
*August*: Färöes.  
*September*: Azores.  
*November*: 45° N. 50° W. (not rare).  
*December*: 45° N. 52° W. (not rare) to 42° N. 63° W. (rare).  
 1899 *April*: 48° N. 9° W. (common); 46° N. 13° W. (rare).  
*May*: Westmannaö; Färöes (rare); 58° N. 4°—7° E.  
*June*: Westmannaö (rare).  
*September*: 75° N. 18° E.

**Temperature:** 9.2, mean of 16 obs., max. 11, min. 4.3 (for the northern Atlantic only).

**Salinity:** 34.48, mean of 15 obs., max. 35.75, min. 32.52, (for the northern Atlantic only).

**Plankton-type.** This species seems to be a neritic form, occurring both in boreal and tropical regions. — Ns (Nt?).



**CHÆTOCEROS CRIOPHILUS** CASTR.

(CL. A Treatise on the Phyto-plankton Pl. I fig. 6.)

- 1898 *March*: 23° N. 17° W.; 40° N. 69° W.  
*April*: 49° N. 19° W.; 40°—41° N., 70° and 58° W.  
*May*: 42° N. 45° W.; 70°—72° N. 14°—16° W.; 67°—68° N.  
 25°—21° W.; 62° N. 2° W.  
*June*: 66° N. 26° W. to 67° N. 29° W. and thence to 69° N.  
 15° W. (common); 68° N. 13° E.; 73° N. 23° E.  
*July*: 62° N. 0° W.  
*August*: Färöes; 76°—80° N. 12°—11° E.; 81° N. 24° E.  
*September*: 60° N. 3° W.; Azores; 75°—76° N. 17°—13° E.  
*October*: Azores.  
*November*: 45°—48° N. 52°—49° W.  
*December*: 45° N. 51° W. to 41° N. 66° W.
- 1899 *May*: 65° N. 13° W. to 67° N. 16° W.  
*June*: 68° N. 3° W. to 70° N. 13° W. (everywhere common),  
 71° N. 10° W. to 73° N. 4° W. (at some spots common).  
*August*: 73° N. 22°—24° W. (rare).  
*September*: 72° N. 16° W. (rare).

**Temperature**: 6.2, mean of 46 obs., max. 20.2, min. —1.3.**Salinity**: 34.23, mean of 45 obs., max. 36.25, min. 31.98.**Plankton-type**. Decidedly arctic, pelagic species. — *T*.**CHÆTOCEROS CURVISETUS** CL.

(GRAN D. Norske Nordhav-Expedition 1876—78 Protophyta. Pl. III fig. 43).

- 1898 *January*: 11° N. 20° W. to 20° N. 18° W.  
*March*: 21° N. 18° W.; 23° N. 17° W.; 58° N. 6° E.; 7° N.  
 55° W.; 33° N. 48° W.  
*June*: 42° N. 9° W.  
*August*: 58° N. 2° W.; 60° N. 2°—3° W. (rare).  
*September*: 59°—60° N. 2° W.; 66° N. 18° W.

**Temperature**: 14.7, mean of 12 obs., max. 25.9, min. 6.**Salinity**: 34.94, mean of 6 obs., max. 35.47, min. 33.78.**Plankton-type**. Neritic form of the temperate Atlantic, occurring only occasionally in the ocean. — *Nm*.

**CHÆTOCEROS DANICUS CL.**

(Diatoms of Finland. Pl. III fig. 18, 19.)

1898 *March*: 21° N. 18' W.; 41° N. 21° W.1899 *May*: 58° N. 4°—7° E. (very common).**Temperature:** 14.9—15.**Plankton-type.** This species is evidently no oceanic form and occurs along the coasts of the temperate eastern Atlantic. Found in Puget's Sound. — *Nm.***CHÆTOCEROS DEBILIS CL.<sup>1</sup>**

(GRAN I). Norske Nordhavs-Expedition, Protophyta Pl. II fig. 14, 15).

1898 *March*: 58° N. 6° E. (common); Färöes (rare); 63° N. 18° W (not rare); 41° N. 60° W. (common) to 40° N. 69° W. (not rare).*April*: abundant along the south coast of Iceland and at the Färöes; 42° N. 47° W. to 40° N. 70° W (common).*May*: 59° N. 49° W., common; Westmannaö, common; Färöes, not common.*June*: 66° N. 24° W. (rare); South of Iceland, 63° N. 13°—22° W., very common; Färöes, rare; 42° N. 9° W. (rare).*July*: Westmannaö, very common; Färöes, rare; Shetlands, very common.*August*: E. Greenland, 65° N. 35° 33' W., common; W. Greenland, 69° N. 53° W. not rare; SW. and S. of Iceland, common; Färöes, common; Shetlands, rare; 54° N. 5° W. rare.*September*: E. Greenland, 65° N. 36° W. very rare; W. Greenland, 69° N. 53° W., rare; Westmannaö, common; 60° N. 2° W. (not rare).<sup>2</sup><sup>1</sup> Ostenfeld's data used.<sup>2</sup> In my paper in Öfvers. Kongl. Sv. Vet. Akad. Förh. 1899 n. 8 the Engl. Channel has been erroneously indicated.

*October*: rare off S. Iceland and off the Shetlands.

*November*: rare from the S. of Iceland to the Färöes, where common; 48° N. 49° W. to 45° N. 50° W. (more or less rare).

*December*: Iceland, rare; 45° N. 51° W. to 41° N. 66° W. (not common).

1899 *January*: Färöes, rare; 41° N. 69° W., not rare.

*March*: 66° N. 24° W., rare.

*April*: Westmannaö, not rare; Färöes very common.

*May*: Westmannaö and Färöes, very common; 61° N. 1° W., rare; 62° N. 2° E., very common.

*June*: Westmannaö, not rare.

*September*: 74° N. 18° E., rare; 52° N. 55° W., rare.

**Temperature**: 7.3, mean of 34 obs., max. 16, min. 2.2.<sup>1</sup>

**Salinity**: 34.63, mean of 33 obs., max. 35.56, min. 31.80; exceptionally 26.51.

**Plankton-type**. I have seen this species in samples from Puget's Sound. *Schröder* mentions it from Naples. — *T. Ns*.

### CHÆTOCEROS DECIPIENS CL.<sup>2</sup>

(GRAN. D. Norske Nordhavs-Exp. 1876—78. Protophyta Pl. 1, fig. 2, Pl. III fig. 34).

1897 *December* and

1898 *January*: 32° N. 33° W. (rare); 62° N. 8° W. (rare).

*February*: 61° N. 3° W. (very rare).

*March*: 41° N. 23° W. (not rare); 47° N. 27° W. (common); 48° N. 6° W. (common); 58° N. 6° E. (common); 59° N. 1° E. to 62° N. 11° W. (rare); Färöes (rare); 63° N. 18° W. to 64° N. 25° W. (not rare); 41° N. 60° W. to 40° N. 72° W. (common).

*April*: area between 39° N. 24° W., 50° N. 9° W. and 49° N. 23° W. (on the whole rare); 43° N. 52° W. to 42° N. 61° W. (common); 73° N. 5° W.; 66° N. 24° W.; 61° N. 50° W.

<sup>1</sup> For the means only such samples have been used as contained this species abundantly.

<sup>2</sup> Ostenfeld's data used.

- (not rare); 63° N. 23° W. to 63° N. 17° W. (not rare); 60° N. 19° W.; Färöes and Färöe Channel (rare); Shetlands (common); 58° N. 2° W. (not rare); 62° N. 2° E. (not rare).
- May*: 70° N. 15° W. to 72° N. 13°—14° W. (rare); south of Iceland, the Färöes, the Shetlands and 62° N. 2° E., very common everywhere, but rare at 59° N. 1°—2° W. and in the Färöe Channel; not rare at 63° N. 3° E.; more or less rare between 61° N. 6° W. and 58° N. 23° W.; 59° N. 49° W. (not rare); 63° N. 54° W. (common); 45° N. 41° W. to 41° N. 53° W. (common).
- June*: 44° N. 9° W. (very rare); 68° N. 19° W. to 66° N. 27° (not rare); Davis's Strait, 63° N. 56° W. (not rare) and 66° N. 55° W. (common); S. of Iceland (rare); Färöes and Shetlands (common but more or less rare in the Färöe Channel); 62° N. 2° 30' E. (very common); between Finmarken and Beeren Island, common at 74° N. 23° E.; not rare east of Spitzbergen (76°—77° N. 26°—27° E.).
- July*: more or less sparingly W. S.W. of Iceland, common at Westmannaö and at the Färöes; rare in the Färöe Channel and round the Shetlands, rare at 67° N. 7° W.; rare at 60° N. 17° and 23° W.; not rare at 59° N. 2° W. and west of Spitzbergen, 78° N. 3° W.—4° E.
- August*: 54° 31' N. 5° 12' W. (rare); Shetlands (rare); Färöes (common); Westmannaö (common); from S.W. Iceland to E. Greenland (64° N. 21° W. to 65° N. 36° W.) rare; E. of Spitzbergen, 77°—80° N. 10°—34° E., abundant.
- September*: Westmannaö (rare); rare south of Denmark's Sound; Färöes rare; Shetlands, rare; south of Beeren Island, rare.
- October*: rare at Westmannaö; the Färöes to the Shetlands.
- November*: as a rule rare from the south of Iceland to the Färöes; not rare on the Newfoundland Banks and along the American coast, 48° N. 40° W. to 40° N. 68° W.; 48° N. 29° W. (rare); 56° N. 23° W. (rare); 51° N. 20° W. (not rare).
- December*: S. Iceland to Scotland (rare); 47° N. 45° W. to 41° N. 68° W. (rare to common).
- 1899 *January*: Färöes, rare; 45° N. 49° W. to 41° N. 69° W., as a rule rare.
- February*: Färöes, rare.
- March*: rare from 62° N. 8° W. to 65° N. 24° W.

*April*: 44° N. 15° W., rare; 48° N. 9° W., rare; Färöes, common; Westmannö, common.

*May*: as a rule rare from 61° N. 1° E. to the Shetlands and the Färöes, where not rare; rare between the Färöes and Iceland; common at Westmannö; 50° N. 39° W. and 48° N. 45° W., rare; 47° N. 50° W., common.

*June*: Westmannö, common; 62° N. 1° E. to 67° N. 3° W., very common; more or less rare round Jan Mayen; 71° N. 9° W. to 73° N. 4° W. as a rule rare; between Norway and Beeren Island not rare; SW. and S. of Spitzbergen, rare.

*July*: NW. of Spitzbergen, rare; 78° N. 53° E., rare; 75° N. 18° W. to 71° N. 21° W., rare to common; 52°—53° N. 54°—51° W., not rare.

*August*: 80° N. 51° E. and 76° N. 41° E., rare; 70° 50' N. 22° 33' W., common; 71°—73° N. 20°—27° W., more or less rare.

*September*: 81° N. 16° E. to 73° N. 19° E., common to rare; 69° N. 13° W., rare; 53° N. 52° W., rare.

*October*: 53° N. 31° W., rare.

**Temperature**: 7.6, mean of 47 obs.,<sup>1</sup> max. 13.5, min. 0.6.

**Salinity**: 34.50, mean of 47 obs., max. 35.94, min. 30.98.

**Plankton-type.** I have found this species in a collection from Puget's Sound. The mean temperature and salinity prove that this species is an arctic form, which however spreads by currents far to the south and propagates in water of so high a salinity as 35 p. m. — *C.*, *T.* (*C.* in 35 p. m. *T.* in 34 p. m. salinity.)

### CHÆTOCEROS DENSUS CL.

(*C. borealis* var. *dens.* CL. A Treatise on the Phyto-plankton Pl. I (fig. 3, 4.)

1898 *January*: 12° N. 19° W.; 16° N. 18° W. (common).

*March*: 25° N. 16° W.; 49° N. 18° W.; 49° N. 2° W.; 45° N. 36° and 40° W. (rare); 41° N. 49° W.

*April*: 50° N. 3° W.; 47° N. 40° W.

<sup>1</sup> The means are calculated from such samples only as contained this species abundantly.

*May*: 50° N. 7° W.

*June*: 42°—44° N. 9° W.

*August*: 54° N. 5° W.; 58°—59° N. 2° W.

*September*: 49° N. 3° W.; 59° N. 2° W., rare; 60° N. 2° W., common.

*November*: 40°—41° N. 66°—67° W. (rare).

*December*: Azores; 41° N. 69° W. (rare).

1899 *January*: 45° N. 49° W.

*February*: 34° N. 40° W.

*March*: 47° N. 8° W., rare.

*November*: 52° N. 48° W., rare.

**Temperature**: 13.<sub>8</sub>, mean of 27 obs., max. 22, min. 8.

**Salinity**: 35.<sub>18</sub>, mean of 20 obs., max. 36.<sub>35</sub>, min. 32.<sub>20</sub>.

**Plankton-type**. SCHRÖDER mentions this species from Naples.

— S. *Nm.*

### CHÆTOCEROS DIADEMA EHB.<sup>1</sup>

*C. grönlanticus* CL. Bih. Kongl. Sv. Vetensk. Akad. Handl. Vol. XXII 3 n. 5  
fig. 12.)

1898 *January*: 6° N. 55° W., rare.

*March*: 48° N. 6° W.; 41° N. 60° W. to 40° N. 70° W., common.

*April*: W. and S. of Iceland, very common; Färöes, rare; 43° N. 50° W. to 40° N. 70° W., very common.

*May*: W. of Greenland, 59° N. 49° W. to 63° N. 54° W.

*June*: W. of Greenland, 59° N. 51° W. to 69° N. 54° W. rare.

*August*: between Greenland and S. Iceland, common at 65° N. 36° W.; Färöes, rare; N. of Spitzbergen, rare.

*September*: rare near Beeren Island; W. of Greenland, 69° N. 53° W. (rare).

*November*: 51° N. 20° W. (rare); 45° N. 50° W. (rare).

*December*: 45° N. 51° W. (common) to 42° N. 63° W. (rare).

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<sup>1</sup> Ostenfeld's data used.

1899 *April*: 48° N. 9° W., rare; Färöes, not rare.

*May*: 61° N. 6° W. (very rare); Färöes.

*June*: 72° N. 9° W. and 73° N. 6° W. (rare).

*September*: 75° N. 18° E. to 80° N. 13° E. and 81° N. 16° W (not rare).

**Temperature**: 6.0, mean of 15 obs.<sup>1</sup>, max. 16, min. 1.9.

**Plankton-type**. The low temperature and salinity prove that this species is to be considered as an arctic neritic form. Its occurrence at the north coast of South America in January 1898 is then of the greatest interest. Noted from Jedo Bay, Japan. — *Ns* and *N<sub>g</sub>*.

### CHÆTOCEROS DIDYMUS (EHB).

(Cl., Bih. Kongl. Sv. Vetensk. Akad. Handl. Vol. XXII; 3 n. 2 Pl. I fig. 3, 4.)

1898 *January*: 20° N. 18° W

*March*: 21° N. 18° W.; 48° N. 6° W.; 58° N. 6° E.; 43° 41° N. 41°–49° W

*May*: 48° N. 33° W., rare.

*September*: 60° N. 2° W., rare.

**Temperature**: 12.3, mean of 7 obs., max. 18, min. 6.

**Salinity**: 35.25, mean of 5 obs., max. 35.61, min. 34.59.

**Plankton-type**. This species is evidently a neritic form, only occasionally occurring in the ocean, and then among Styli-plankton. Occurs in Jedo Bay, Japan, and in Puget's Sound. SCHRÖDER mentions it from Naples. — *N<sub>m</sub>*.

### CHÆTOCEROS (DIDYMUS VAR.) LONGICRURIS CL.

(A Treatise on the Phyto-plankton Pl. I fig. 11, 17.)

1898 *March*: 21° N. 18° W.; 41° N. 21° W.; 42° N. 48° W.

*April*: 42° N. 47° W

*May*: 49° N. 23° W

*August*: Azores.

*December*: 29° S. 49° W., very common.

<sup>1</sup> Only such samples considered as contained this species abundantly.

**Temperature:** 17.<sub>8</sub>, mean of 6 obs., max. 23.<sub>8</sub>, min. 13.

**Salinity:** 35.<sub>23</sub>, mean of 4 obs., max. 36.<sub>19</sub>, min. 34.<sub>53</sub> (common).

**Plankton-type.** This species enters the Styli-plankton, but its rare occurrence in the ocean indicates that it is a neritic form. Occurs in the Mediterranean, the Red Sea and the Gulf of Bengal.  
— *Nm*, *Nt*.

### CHÆTOCEROS DIVERSUS CL.

(*C. dir. var. tenuis* CL. A Treatise on the Phyto-plankton Pl. II fig. 2.)

*January:* 7° N. 53° W.

1898 *February:* 16° N. 71° W.

*March:* 7° N. 55° W.; 10° N. 53° W.

*June:* 10° N. 53° W.

*August:* 40° N. 66° W.

*December:* 29° S. 49° W.; 18° N. 67° W.

**Temperature:** 25.<sub>1</sub>, mean of 8 obs., max. 27.<sub>2</sub>, min. 20.<sub>7</sub>.

**Salinity:** 34.<sub>81</sub>, max. 36.<sub>01</sub>, min. 33.<sub>93</sub>.

**Plankton-type.** This species occurs along the coast of South America and follows the Equatorial Current into the Caribbean Sea, continuing with the Florida Current to 40° N., which latitude it reaches, as Desmo-plankton usually does, in August. The occurrence along the coasts and the low salinity indicate it as a neritic form. Noted from the Mediterranean, Red Sea, Indian Ocean and Java.  
— *Nt*.

### CHÆTOCEROS (ATLANTICUS VAR.) EXIGUA CL.

(A Treatise on the Phyto-plankton Pl. I fig. 9.)

1898 *January:* 7° N. 53° W.; 44° N. 17° W.

*March:* 30° N. 35° W. to 45° N. 13° W.; 49° N. 18° W.

*April:* 49° N. 19° W.; 48° N. 29° W. to 50° N. 9° W.

*June:* 48° N. 17° W.

*August:* Azores.

*November:* Azores; 56° N. 23° W.

1899 *January:* 33° N. 15° W.

*March:* 34° N. 40° W.

*April:* 46° N. 13° W.



**Temperature:** 15.1, mean of 17 obs., max. 26.1, min. 10.8.

**Salinity:** 35.66, mean of 11 obs., max. 36.35, min. 35.17.

**Plankton-type.** *C. neapolitanus* SCHRÖDER represents this form, which thus occurs also in the Mediterranean. — S.

### CHÆTOCEROS FEMUR SCHÜTT.

(Ber. d. Deutschen Bot. Gesells. 1895 Vol. XIII pag. 45).

1897 *December:* 12° N. 50° W., very rare.

1898 *January:* 7° N. 53° W., rare.

**Temperature:** 26.1 to 26.5.

**Plankton-type:** *D.* (or *N?*).

### CHÆTOCEROS FURCA CL.

(A Treatise on the Phyto-plankton Pl. I fig. 10).

1898 *January:* 6°—7° N. 55°—53° W.

*February:* 15° N. 71° W.

*March:* 28° N. 38° W.; 36° N. 29° W. to 41° N. 21°—23° W.;  
41° N. 56° W. to 43° N. 48° W.

*April:* 49° N. 22° W.

*May:* 41° N. 51° W.

*December:* 18° N. 67° W.

1899 *March:* Azores.

*May:* 35° N. 75° W.

**Temperature:** 18.1, mean of 16 obs., max. 27, min. 11.

**Salinity:** 35.78, mean of 10 obs., max. 36.40, min. 34.88.

**Plankton-type.** This species occurs in the region round the Sargasso Sea and belongs to the tropical or subtropical Styli-plankton. It has not been seen beyond 50° N. Found in the Indian Ocean, the Mediterranean and the Red Sea. — S.

**CHÆTOCEROS FURCELLATUS BAIL.**

(Cl. Bih. Kongl. Sv. Vetensk. Akad. Handl. Vol. XXII; 3 n. 4 Pl. II fig. 7. GRAN  
Biblioth. botan. Heft. 42 Pl. I fig. 15, 16.)

1898 *May*: 72° N. 14° W. 67° N. 22° W.; Westmannaö, common;  
59° N. 49° W., common.

*June*: 67° N. 24°–29° W.; 59° N. 49° W. to 69° N. 54° W.;  
E. of Beeren Island; S. of Spitzbergen.

*July*: Westmannaö, common; 78° N. 3° W., rare.

*August*: Westmannaö, very common; 80° N. 11° E. (not rare).

*September*: 69° N. 53° W.; rare.

1899 *May*: Westmannaö, rare.

*June*: Westmannaö, rare.

*July*: 71°–72° N. 21°–22° W., rare; 74° N. 20° W., common;  
80° N. 12° E., rare.

*September*: 74°–75° N. 18° E., rare.

**Temperature**: 4.5, mean of 21 obs., max. 10.2, min. —1.3.

**Salinity**: 34.03, mean of 22 obs., max. 34.71, min. 28.01.

**Plankton-type**. Arctic neritic form. It is noted from Kamtschatka. — *Ng*.

**CHÆTOCEROS GRANII CL.**

(Cl. Kongl. Sv. Vet. Akad. Handl. Vol. XXXII n. 8 pag. 25).

1899 *June*: 72°–73° N. 18°–19° E.

*July*: 71° N. 21° W.

**Temperature**: 1 to 8.86.

**Salinity**: 31.32 to 35.12.

**Plankton-type**: *Ng*?

**CHÆTOCEROS HIEMALIS CL.<sup>1</sup>**

(*C. didymus* var. CL. A Treatise on the Phyto plankton Pl. I fig. 18.)

1898 *March*: 58° N. 6° E.

*July*: Westmannaö, rare.

*September*: 76° N. 13° E., rare.

<sup>1</sup> Since the above was written I have been convinced, that this species is the same as *C. brevis* SCHÜTT, which name has the priority.

*November*: 45° N. 50° W., rare.

1899 *May*: 58° N. 4°—8° E. (common).

**Temperature**: 8.4, mean of 4 obs., max. 11, min. 6.

**Salinity**: 33.95, mean of 4 obs., max. 35.13, min. 32.58; exceptionally 23.52.

**Plankton-type**: *Ns.*

### CHÆTOCEROS LACINIOSUS SCHÜTT.<sup>1</sup>

(GRAN. Den Norske Nordhavs-Expedition Pl. 1 fig. 4—7.)

1898 *April*: 66° N. 24° W., rare.

*July*: Westmannaö, common.

*August*: Westmannaö, rare.

*September*: Disco, not rare.

*November*: 63° N. 13°—16° W., very rare.

*December*: 46° N. 50° W. to 43° N. 61° W., rare to common.

1899 *May*: Westmannaö, rare; 60° N. 4° W., rare.

*June*: Westmannaö, rare.

**Temperature**: 8.1, mean of 12 obs., max. 10.2, min. 2.7.

**Salinity**: 33.27, mean of 12 obs., max. 35.32, min. 31.96.

**Plankton-type**. Occurs in the northern Pacific (Lemmermann).

— *Ns.*

### CHÆTOCEROS LONGISETUS CL.

(Kongl. Sv. Vetensk. Akad. Handl. Vol. XXXIV n. 1 Pl. VII fig. 25—29.)

1898 *March*: 7° N. 55° W.

**Temperature**: 25.9.

**Plankton-type**: *Nt.*

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<sup>1</sup> Ostenfeld's data for *C. lacinosus* Schütt, but not for *C. lac. aff.*, used.

**CHÆTOCEROS LORENZIANUS** GRAN.

(C. A. Treatise on the Phyto-plankton Pl. I fig. 13—15).

1897 *December* and1898 *January*: 12°—20° N. 18° W.; Azores; 44° N. 17° W.; 6° N. 55° W. to 19° N. 45° W.; Caribbean Sea; 25°—35° N. 74° W.*February*: 13° N. 70° W. to 34° N. 74° W.*March*: 21°—25° N. 18°—16° W.; Azores; 41° N. 21°—23° W.; 49° N. 18° and 33° W.; 7°—10° N. 55°—53° W.; Caribbean Sea; 28° N. 74° W.; 40° N. 64° W.*April*: Azores; 49° N. 33° W. to 50° N. 9° W.; 7°—10° N. 55°—53° W.; Caribbean Sea; 42° N. 47° W.*May*: Caribbean Sea; 20° N. 60° W.*July*: Caribbean Sea.*August* and *September*: Azores; Caribbean Sea.*October*: Caribbean Sea; 42° N. 64° W.*November*: Azores.*December*: Azores; 18° N. 67° W.1899 *January*: 33° N. 15° W.*February*: 32°—34° N. 47°—40° W.*March*: 47°—49° N. 8°—9° W.*April*: 46° N. 13° W. to 49° N. 7° W.; 32° N. 75° W.**Temperature**: 19.4, mean of 43 obs., max. 28.4, min. 11.**Salinity**: 35.72, mean of 29 obs., max. 36.96, min. 34.79.

**Plankton-type.** This species occurs in the tropical and temperate Atlantic, round the Sargasso Sea, has in the spring the same distribution as the Styli-plankton in general, but reaches scarcely beyond 50° N. Although of frequent occurrence in the Desmoplankton of the western Atlantic, it must be considered as belonging to the Styli-plankton. Occurs in the Mediterranean, Red Sea and Indian Ocean. — S.

**CHÆTOCEROS OSTENFELDII** CL.<sup>1</sup>

(K. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. VIII fig. 19).

1898 *April*: 49°—48° N. 19°—29° W., abundantly; Färöe Channel; S. of Iceland; 59° N. 28°—22° W., everywhere rare.

*May*: The area between the Orkneys, S. Iceland and 57° N. 34° W., more or less abundant along 60° N. from 10° to 34° W.

*June*: 57° N. 46° W. rare.

*July*: 63°—64° N. 14°—23° W., rare.

*August*: 63°—65° N. 25°—33° W., more or less common.

*September*: 64° N. 32° W. to 62° N. 21° W., more or less rare.

**Temperature**: 8 to 13.s.

**Salinity**: 35.50 (extremes 33 and 35.57).

**Plankton-type**: S.

**CHÆTOCEROS PERUVIANUS** Brw.

Cl. Fifteenth annual report of the Fishery Board for Scotland, for 1896, pag. 299 fig. 7).

1897 *December* and

1898 *January*: 12°—20° N. 19°—18° W.; 36° N. 27° W. to 44° N. 17° W.; 12° N. 50° W. to 7° N. 53° W.; 35° N. 74° W.

*February*: 13°—16° N. 70°—71° W.

*March*: 33°—36° N. 32°—29° W.; 1° S. 28° W.; 3° N. 24° W.; 10° N. 53° W.

*April*: 48° N. 29° W.; 15° N. 49° W.

*June*: 31° N. 48° W.

*August*: Azores; 41° N. 57° W.

*September*: Azores.

*October*: 21° S. 36° W.

1899 *February*: 34° N. 40° W.

*April*: 44°—46° N. 15°—13° W.; 32° N. 75° W.

*June*: 3°—4° S. 20°—19° W.

<sup>1</sup> Ostenfeld's data for »*C. laciniatus aff.*» used.

**Temperature:** 21.<sub>6</sub>, mean of 28 obs., max. 28, min. 13.<sub>6</sub>.

**Salinity:** 36.<sub>05</sub>, mean of 12 obs., max. 37.<sub>21</sub>, min. 34.<sub>32</sub>.

**Plankton-type.** Noted from the Mediterranean, the Red Sea, the Indian Ocean and the Pacific. — *S. (D).*

### CHÆTOCEROS RUDIS CL.<sup>1</sup>

(*C. borealis* var. *rudis* CL. A Treatise of the Phyto-plankton, Pl. I fig. 5.)

1897 *December* and

1898 *January:* 32° N. 33° W.; 7° N. 53° W. to 12° N. 50° W.; 15° N. 70° W.; 25°—35° N. 74° W.

*February:* 5° S. 9°—4° E.; 6° S. 12° W.; 13°—16° N. 70°—71° W.; 26° N. 74° W.

*March:* 6° S. 4° W.; 1° S. 27° W.; 10° N. 20° W.; 28°—30° N. 38°—35° W.; 9° N. 59° W.; 28° N. 74° W.

*April:* 14° N. 70° W.; 31° N. 75° W.

*May:* 28° N. 45°—47° W.; Azores.

*June:* Azores.

*July:* 15° N. 71° W.; 38° N. 74° W.; 41° N. 60°—58° W.

*August:* 17° N. 71° W.; 22° N. 74° W.; 40° N. 67° W. to 42° N. 48° W.

*September:* 12° N. 27° W.; 15° N. 71° W.; 20° N. 45° W.; 38° N. 74° W.; 42° N. 57° W.

*October:* 21° S. 36° W.; 38° N. 74° W.; 41°—42° N. 59°—50° W.

*November:* 40°—42° N. 67°—64° W.; 44° N. 55° W.; 47° N. 41° W.

1899 *April:* 9° N. 59° W.

*May:* 25° S. 7° E.

**Temperature:** 23.<sub>1</sub>, mean of 58 obs., max. 28.<sub>8</sub>, min. 10.

**Salinity:** 35.<sub>01</sub>, mean of 36 obs., max. 37.<sub>21</sub>, min. 32.<sub>21</sub>, exceptionally 20.<sub>29</sub>.

**Plankton-type.** Occurs in the eastern and western tropical Atlantic, not far from the coasts, which together with the low mean salinity indicates that this species is essentially a neritic form. — *Nt* and *D.*

<sup>1</sup> Since the above was written, I found this form to be the same as *C. coarctatus* Lauder. The above name must then be abolished.

**CHÆTOCEROS SALTANS** CL.

(A Treatise on the Phyto-plankton Pl. I fig. 8).

1898 *April*: 10° N. 53° W.**Temperature**: 22.**Plankton-type**. Noted from 38°—36° N. 48° and 63° W.  
— *D*?**CHÆTOCEROS SCHÜTTII** CL.

(GRAN. Den Norske Nordhavs-Expedition Pl. II fig. 19, 20).

1898 *March*: 45° N. 13° W.*April*: 39° N. 24° W.; 48° N. 23° W.*May*: 45° N. 43° W.; 49° N. 23° W.; 60° N. 1° W., common.*June*: Westmannaö, rare; 62° N. 2° 30' E., not rare.*November*: 53° N. 32° W., rare; 60° N. 1° W., rare; 63° N. 13° W., rare; 45° N. 50° W., not rare; 45° N. 52° W., very common.*December*: 45° N. 51°—53° W., common.1899 *March*: 5° N. 16° W.; 46°—49° N. 11°—9° W.*April*: 45° N. 13° W., rare; 48° N. 9° W., very common.*May*: 51° N. 20° W., rare; 60°—61° N. 4°—6° W., common.*October*: 53° N. 31° W., not rare.*November*: 51° N. 28° W., rare.**Temperature**: 11.5, mean of 21 obs., max. 22, min. 5.**Salinity**: 34.98, mean of 21 obs., max. 38.05, min 32.01.**Plankton-type**. I have found this species in collections from Jedo Bay (Japan) and Puget's Sound. The salinity of some of the richest Atlantic collections was only 32.39 and 32.63, which indicates that this species is neritic, occurring only occasionally drifting in the ocean. — *Nm*.**CHÆTOCEROS SCOLOPENDRA** CL.

(Bih. Kongl. Sv. Vetensk. Akad. Handl. Vol. XXII 3 n. 5 fig. 4, 5).

1898 *March*: 21° N. 18° W.; 41° N. 60° W.; 40° N. 68° W.*April*: 66° N. 24° W.

*July*: 64° N. 23° W., not rare.

1899 *May*: 62° N. 2° E.; 61° N. 1° E., rare; 65° N. 1° W., rare.

**Temperature**: 9.3, mean of 6 obs., max. 15, min. 5.

**Salinity**: 34.66, mean of 5 obs., max. 35.51, min. 32.56.

**Plankton-type**. This species is not oceanic. The occurrence west of the tropical Africa is very remarkable, as it else occurs north and south of Iceland and in the winter plankton of the Skagerak. LEMMERMANN mentions it from the northern Pacific. -- N's.

### CHÆTOCEROS SKELETON SCHÜTT.<sup>1</sup>

(CL. A Treatise on the Phyto-plankton Pl. II fig. 3.

1898 *January*: 44°—46° N. 17°—11° W.; 7° N. 53° W.

*March*: 1° S. 15° W.; area between the Azores, 45° N. 13° W. and 49° N. 18° W.

*April*: 48°—50° N. 29°—8° W.; 10° N. 53° W.

*May*: 48° N. 25° W.; 50° N. 14° W.; 57° N. 28° W. to 59° N. 15° W.

*June*: 63° N. 19° W.

*July*: 60° N. 23° W. to 61° N. 8° W.

*August*: Azores; 63° N. 25° W. to 65° N. 33° W.

*September*: Azores; Denmark's Sound.

*October*: 59° N. 16° W. and 60° N. 4° W.

**Temperature**: 15.4, mean of 24 obs., max. 26.2, min. 11.

**Salinity**: 35.61, mean of 19 obs., max. 36.28, min. 35.17.

**Plankton-type**. The salinity and temperature prove that this species is an oceanic form of the Styli-type. It occurs chiefly in the eastern Atlantic, having once only been seen in the west, north of South America. In March and April it occurred between the Azores and the Engl. Channel, had in May advanced north of Rockall, in June to the south coast of Iceland, whence it in August drifted towards Greenland and the Shetlands. It occurs in the Indian Ocean. — S.

<sup>1</sup> Ostenfeld's data used.



**CHÆTOCEROS SOCIALIS** LAUDER.

(Cl. Bih. K. Sv. Vet. Akad. Handl. Vol. XXII 3 n. 4 Pl. II fig. 9.)

1898 *April*: Färöes.*June*: S. of Iceland, common.*July*: W. of Iceland.1899 *July*: 74° N. 20° W., common.**Temperature**: 0.1 to 9.**Salinity**: 31.22 to 35.44.**Plankton-type.** This species is an arctic, neritic form, noted from Baffin's Bay. I have met with it in a collection from Puget's Sound. Noted also from Hongkong. It occurs, in the winter, abundantly in the Skagerak. — *Ng.***CHÆTOCEROS (BOREALIS VAR.) SOLITARIA** CL.

(Fifteenth annual report of the Fishery Board for Scotland, for 1896 pag. 298.)

1898 *March*: 40°—41° N. 69°—70° W.*June*: 65° N. 31° W.*July*: 61°—62° N. 4° W.*August*: 65° N. 12° W.; 76° N. 11° E.**Temperature**: 7.5, mean of 8 obs., max. 11, min. 5.5.**Salinity**: 34.85, mean of 8 obs., max. 35.31, min. 32.41.**Plankton-type.** The observations are too few for deciding the plankton-type to which this form really belongs. It has been found both i Styli-, Tricho- and Chæto-plankton.**CHÆTOCEROS TERES** CL.<sup>1</sup>

(Bih. Sv. Vet. Akad. Handl. Vol. XXII: 3 n. 5 fig. 7.)

1898 *March*: S. of Iceland; Färöes; W. of Norway, 58° N. 6° E.*April*: S. of Iceland; 43° N. 50° W.*May*: Färöes; 61° N. 1° W.*June*: Färöes; 58° N. 2° W.; 74° N. 23° E.*July*: 63° N. 14° W.; common; Färöes, not rare.<sup>1</sup> (Ostenfeld's data used.)

*August*: Färöes; 78—80° N. 11°—12° E.

*September*: W. Greenland, Disco, rare.

*December*: 42° N. 39° W. to 45° N. 50° W., rare.

1899 *March*: 66° N. 19° W.

*April*: 49° N. 7° W.

*May*: 61° N. 1° E., rare; Färöes, not rare; Westmannaö, common.

*June*: 65° N. 1° W., rare.

*July*: 71° N. 21° W., rare; 79—80° N. 10°—14° E.

*September*: 74° N. 18° E. to 81° N. 16° E., not rare.

*November*: 52° N. 55° W., very rare.

**Temperature**: 5.8, mean of 35 obs., max. 11.8, min. 0.7

**Salinity**: 34.48, mean of 36 obs., max. 35.60, min. 32.12, exceptionally 26.51.

**Plankton-type**: *T.*, *Ns.*

### CHÆTOCEROS TETRASTICHON CL.

(A Treatise on the Phyto-plankton Pl. I fig. 7.)

1897 *December* and

1898 *January*: 32° N. 33° W.; 41° N. 21° W.; 44° N. 17° W.; 46° N. 11° W.

*February*: 16° N. 71° W.; 26° N. 74° W.

*March*: 12° N. 51° W.; 15° N. 49° W.; 22° N. 43° W.; 30° N. 35° W.; 32° N. 74° W.; 45° N. 13° W.

*April*: 10° N. 53° W.; 23° N. 72° W.

*May*: 23° N. 56° W.; 28° N. 47° W.

*June*: 10° N. 53° W.; 22° N. 60° W.; 25° N. 57° W.; 30° N. 52° W.

*July*: 15° N. 71° W.; 26° N. 48° W.; 31° N. 39° W.; 33° N. 74° W.

*August*: 22° N. 74° W.; 34° N. 73° W.; Azores; 41° N. 57° W.

*September*: 25° N. 74° W.; Azores.

*December*: 18° N. 67° W.; Azores.

**Temperature**: 23.1, mean of 33 obs., max. 28, min. 11.9.

**Salinity**: 36.16, mean of 19 obs., max. 37.04, min. 34.33.

**Plankton-type**. This species occurred thus from March to

July in the Sargasso Sea and the Florida Current, advanced in August beyond 40° N. and appeared round the Azores from August to the end of the year. SCHRÖDER mentions it from Naples. — *D.*

### CHÆTOCEROS VOLANS SCHÜTT.

(*C. currens* Cl. Fifteenth annual report of the Fishery Board for Scotland, for 1896, pag. 298, fig. 8.)

1897 *December*

1898 *January*: 16° N. 18° W.; 41° N. 22° W. to 43° N. 18° W.; 46° N. 11° W.; 4° S. 29° W.; 25° N. 74° W.

*February*: 16° N. 71° W.

*March*: area between 36° N. 29° W., 48° N. 6° W., 49° N. 33° W. and 43° N. 50° W.; 64° N. 25° W.; 9° N. 59° W.

*April*: area between 39° N. 24° W., 41° N. 19° W., 50° N. 9° W. and 48° N. 29° W.

*May*: 45° N. 43° W.; 41° N. 51° W.

*June*: Azores; 44° N. 9° W.; 10° N. 53° W.

*July*: 62° N. 0°—4° W.; 77° N. 7° E. (abundant); 40°—41° N. 69°—58° W.

*August*: Azores; 77° N. 8°—12° E. (very common); 17° N. 71° W.; 40°—41° N. 66°—62° W.

*September*: 59° N. 2° W.; 66° N. 18° W. (rare).

*October*: Azores; 57° N. 18° W. (rare).

*November*: 48° N. 29° W.; 55° N. 21° W. (rare).

*December*: 41° N. 66° W.; 47° N. 45° W. (rare).

1899 *September*: 65° N. 3° W. (very common); 65° N. 2° W. (rare).

*November*: 51° N. 13° W., rare.

**Temperature:** 14.<sub>1</sub>, mean of 52 obs., max. 27.<sub>2</sub>, min. 5.<sub>34</sub>.

**Salinity:** 35.<sub>09</sub>, mean of 41 obs., max. 36.<sub>18</sub>, min. 31.<sub>84</sub>.

**Plankton-type.** This form, which perhaps is a variety of *C. peruvianus*, occurred in the spring, March and April, on the wide area between the Azores, the Engl. Channel, and the Newfoundland Banks and also south of Iceland, in July in the Färöe Channel, in July and August abundantly at Spitzbergen; later it was seen only rarely. — *S.*

**CLIMACODIUM BICONCAVUM** CL.

(A Treatise on the Phyto-plankton Pl. II fig. 16, 17.)

1897 *December* and1898 *January*: 19° N. 45° W. to 12° N. 50° W.; 25°—35° N. 74° W.*February*: 16° N. 71° W.*March*: 32° N. 43° W. to 15° N. 49° W.; 16° N. 70° W.; 28° N. 74° W.*April*: 10°—7° N. 53°—55° W.; 14° N. 70° W.*May*: 16° N. 71° W.; 28° N. 45° W.*June*: 10° N. 53° W.; 19° N. 63° W.; 22° N. 60° W.*July*: 15° N. 71° W.; 25° N. 74° W.; 41° N. 58°—60° W.*August*: 28°—25° N. 74° W.; 42° N. 62°—50° W.*September*: 17° N. 48° W.; 20° N. 45° W.*November*: 42° N. 64° W.*December*: 26° S. 45° W.1899 *April*: 36° N. 74° W.*May*: 35° N. 75° W.*June*: 1° N. 23° W.**Temperature**: 24.5, mean of 33 obs., max. 28, min. 16.**Salinity**: 35.81, mean of 21 obs., max. 37.41, min. 33.20.**Plankton-type.** Occurs in the Mediterranean and the Red Sea. — D.**CLIMACODIUM FRAUENFELDIANUM** GRUN.

(C. Jacobi Cl. A Treatise on the Phyto-plankton Pl. II fig. 18.)

1897 *December* and1898 *January*: 11° N. 20° W.; 12° S. 34° W.; 7° N. 53° W. to 12° N. 50° W.*February*: Caribbean Sea.*March*: 3° N. 24° W.; 11° N. 19° W.; 9°—10° N. 59°—53° W.*April*: 14° N. 70° W.*May*: 13° N. 51° W.*July*: 15° N. 71° W.; 41° N. 58° W.*August*: 40° N. 66° W. to 41° N. 57° W.*September*: 38° N. 74° W.

*November*: 9° S. 34° W.; 4° N. 30° W.; 8° N. 28° W.; 40°  
—42° N. 68°—64° W

1899 *June*: 40° N. 38° W.; 12° N. 52° W.

**Temperature**: 25.<sub>1</sub>, mean of 27 obs., max. 28, min. 18.<sub>2</sub>.

**Salinity**: 35.<sub>21</sub>, mean of 16 obs., max. 38.<sub>54</sub>, min. 33.<sub>11</sub>.

**Plankton-type**: Occurs in the Red Sea, the Indian and Pacific Ocean. — *D*.

### CORETHRON HYSTRIX HENSEN.<sup>1</sup>

(Gl. Fifteenth annual report of the Fishery Board for Scotland, for 1896, pag. 299  
fig. 15.)

1898 *March*: 21° N. 18° W.; 25° N. 16° W.; 41° N. 20° W. to  
44° N. 17° W. and 48° N. 6° W.; 7° N. 55° W.

*April*: Azores; 48° N. 29° W.; 50° N. 9° W

*May*: 57° N. 21° W. to 60° N. 10° W.; 61° N. 28° W.

*June*: area between 60° N. 9° W., 63° N. 12° W. and 62° N.  
2° 30' E.; 57° N. 46° W.

*July*: 63° N. 13° W.; Färöe Channel; 62° N. 4° W.

*August*: S. W. of Iceland to E. Greenland (65° N. 36° W.); S.  
of Iceland to the Färöes and the Shetlands; S. W. of Spitz-  
bergen, 76°—78° N. 11° E.

*September*: Denmark's Sound; S. W. of Iceland; Färöe Channel;  
70° N. 21° E. to 76° N. 13° E.

*October*: 63° N. 10° W. to 60° N. 4° W.; 41° N. 67° W.

*November*: 50° N. 10° W.; 41° N. 69° W to 42° N. 64° W.

*December*: 50° N. 9° W.; 41° N. 66° W.

1899 *January*: 41° N. 69° W.; 40° N. 66° W

*June*: 67° N. 3° W.

*September*: 72° N. 19° E. to 73° N. 18° E.; 55° N. 44° W.,  
very rare.

**Temperature**: 10.<sub>1</sub>, mean of 58 obs., max. 18.<sub>2</sub>, min. 2.<sub>2</sub> ex-  
ceptionally 25.<sub>3</sub>.

**Salinity**: 35.<sub>12</sub>, mean of 50 obs., max. 35.<sub>58</sub>, min. 32.<sub>20</sub>.

<sup>1</sup> Ostenfeld's data used.

**Plankton-type.** This species belongs almost exclusively to the eastern Atlantic, having only once been seen north of South America. It was found in the spring west of Africa and in the area between the Azores and the E. Channel, had in May advanced to the north of Rockall, in June to the Färöe Channel, reached Iceland in July and drifted thence in August towards E. Greenland. In the winter it was seen in the region of the Newfoundland Banks. LEMMERMANN mentions this species from the northern Pacific. — S.

### COSCINODISCUS ANGUSTE-LINEATUS A. SCHM.

(Atlas der Diat. Kunde Pl. LIX fig. 34.)

1899 *July*: 57° N. 23° W., common.

**Temperature:** 13.

**Salinity:** 35.44

**Plankton-type:** S.

### COSCINODISCUS BENGALENSIS GRUN.

(VAN HEURCK Synopsis Pl. CXXXII fig. 9.)

1898 *August, September, October*: Azores.

**Temperature:** 19.9, mean of 4 obs., max. 21.2, min. 18.5.

**Salinity:** 36.28, mean of 3 obs., max. 36.25, min. 36.18.

**Plankton-type.** Noted from Elephant Point, Bengale. I have seen this species in plankton from the Red Sea. Probably a neritic form. — N.

### COSCINODISCUS BIOCULATUS GRUN.

(D. Diat. von Franz Josef-Land 1884 Pl. III f. 30.)

1898 *May*: 72° N. 13° W.

**Temperature:** — 0.1.

**Salinity:** 34.26.

**Plankton-type.** Noted from the North Siberian Sea and the coasts of Greenland — N.

**COSCINODISCUS CONCINNUS** W. SM.<sup>1</sup>

(Roper Micr. Journ. Vol. VI, 1858 Pl. III fig. 12.)

- 1898 *March*: 7° N. 55° W., common; 49° N. 2° W., not rare; 41° N. 60° W. to 40° N. 70° W., as a rule rare.  
*April*: 60° N. 4° W., not rare; 50° N. 3° W., rare.  
*May*: 7° N. 54° W., common; 60° N. 7°-10° W., rare.  
*June*: Färöes, rare; 69° N. 54° W., rare.  
*July*: 59° N. 2° E. and 2° W., rare.  
*August*: 60° N. 4° W., very rare; 61° N. 8° W., very rare; 59° N. 2° W., not rare.  
*September*: 60° N. 2°-6° W., more or less rare; 69° N. 53° W., not rare.  
*October*: 63° N. 12° W., not rare; Färöes, not rare; 60° N. 4° W. and 62° N. 7° W., not rare.  
*November*: 63° N. 13° W., not rare; Färöes, common; 60°-61° N. 4°-5° W., not rare; 41° N. 66° W., rare.  
*December*: Färöes, very common; 41° N. 61° W., common; 41° N. 66° W.
- 1899 *January*: Färöes, common; 45° N. 49° W., rare; 41° N. 69° W. not rare.  
*February, March and April*: Färöes, common.  
*May*: Färöes, common; 57° N. 3° E., not rare; 47° N. 57° W., not rare.

**Temperature:** 7.4, mean of 35 obs., max. 11.3, min. 2.7 — (North of S. America 26.6—26.7).

**Salinity:** 34.70, mean of 35 obs., max. 35.55, min. 31.82. — (North of S. America: 31.82—32.62).

**Plankton-type.** This species occurs most abundantly in the region of the Färöes, round the British Islands and along the E. coast of N. America. Its occurrence N. of S. America is very interesting. — *Ns.*

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<sup>1</sup> Ostenfeld's data used.

**COSCINODISCUS EXCENTRICUS** EHB.<sup>1</sup>

A. Schmidt Atlas Pl. LVIII fig. 46—49.

1898 *January*: 48° N. 6° W.; 32° N. 74° W.*March*: 21° N. 18° W.*April*: 60°—61° N. 4°—7° W.*May*: 60° N. 2° W. to 58° N. 21° W.*June*: 62° N. 14° W.*August*: 60° N. 4° W.*September*: 60° N. 4° W.; 60° N. 21° W.; 63° N. 25° W.*October*: rare from the Shetlands to 63° N. 12° W. and to 60° N. 27° W.*November*: 60° N. 4° W. to 62° N. 8° W.1899 *February*: 60° N. 1° W.*March*: 62° N. 7° W.; 64° N. 11° W.*April*: 49° N. 7° W.**Temperature**: 9.9, varying from 5.60 to 19.**Salinity**: 35.33, varying from 34.81 to 35.60.**Plankton-type.** This species is widely distributed along the coasts and occurs only exceptionally in the oceans. As dead shells scarcely can be distinguished from those of *C. sol*, it is hardly possible to indicate its distribution. — *Ns* ?**COSCINODISCUS NOBILIS** GRUN.(R. Micros. Soc. Journ. 1879 Pl. I fig. 1. *Cosc. gigas* Janisch Gazelle Exp. Pl. III fig. 4.)1898 *February*: 5°—6° S. 9°—12° E.**Temperature**: 26.2 to 27.3.**Salinity**: 20.29 to 33.93.**Plankton-type**: *Nt*.<sup>1</sup> Ostenfeld's data used.



COSCINODISCUS OCULUS IRIDIS EHB.<sup>1</sup>

(*C. asteromphalus* var. *hybrida* GRUN. D. Franz Josef Land. Pl. III fig. 9.)

1898 *January*: 6° N. 55° W., abundant.

*February*: 13° N. 69° W.; S.W. of Iceland; 50° N. 10° W.;

34° N. 74° W., abundant; 45° N. 50° W. to 49° N. 31° W.

*March*: 71° N. 1° 30' W.; S. and S.W. of Iceland; Färöe

Channel; Denmark's Sound; Davis's Strait; 7° N. 54° W.;

63° N. 1° 36' E., common; 61° 33' N. 2° E.; 42° N.

42° W. to 40° N. 71° W.<sup>2</sup>

*April*: 73° N. 5° W.; W. and S. of Iceland; SW. of the Fär-

öes; 62° N. 2° E., rare; 44° N. 41° W. to 40° N. 70° W.

*May*: 7° N. 54° W.; 78° N. 2° 30' W. to 68° N. 17° W.,

abundant S.W. of Jan Mayen; S. of Iceland; N. of the Shet-

lands; 45° N. 41° W. to 40° N. 72° W., very common at

53—56° W.

*June*: North of Iceland (68° N. 19° W.) and thence into Den-

mark's Sound, 65° N. 31° W., very abundant at 66° N.

27° W.; E. of Spitzbergen, common; 45° N. 41° W.

*July*: 64° N. 3° W. to 63° N. 1° W.; very rare at 49° N.

22° W., 30° N. 38° W. and 40° N. 67° W.

*August*: rare at the Shetlands and E. of Spitzbergen.

*September*: rare N. of Iceland, W. of the Shetlands, at 56° N.

36° W. and 53° N. 49° W.

*October*: very rare at 56° N. 31° W.; Färöes not rare.

*November*: Westmannaö, common; 56° N. 30° W. (common)

to 53° N. 49° W. (rare).

*December*: 48° N. 40° W. to 41° N. 66° W. (abundant).

1899 *January*: 48° N. 39° W.; 43° N. 57° W., common; 41° N.

69° W.

*February*: Färöes, common.

*March*: 64° N. 11° W., 66° N. 20° W. and 65° N. 24° W.,

everywhere rare.

*April*: Westmannaö, rare; Färöes, not rare.

<sup>1</sup> Ostenfeld's data not used.

<sup>2</sup> There is a misprint in my paper in Öfvers. Kongl. Sv. Vet. Akad. Förh. 1899 pag. 792, where stated 31° W. in stead of 71° W.

*May*: Färöes, very common; 64° N. 12° W. to 61° N. 1° W., more or less rare; 48° N. 45° W. to 46° N. 57° W. common.

*June*: 71° N. 9—10° W. and 69° N. 13° W., rare; Westman-naö, rare; 62° N. 2° E., not rare; between 67° N. 11° E., 70° N. 20° E. and 71° N. 6° E., rare.

*July*: along the east coast of Greenland, between 71° and 75° N., usually rare, but in some spots common; 80° N. 14° E.; 75° N. 49° E. to 79° N. 53° E., not rare; 56° N. 38° W. to 52° N. 44° W., in some spots very common.

*August*: along the east coast of Greenland, 71°—73° N., rare; 76° N. 41° E., rare; 80° N. 51° E., very common.

*September*: 77° N. 14° E. to 75° N. 17° E., rare.

*October*: 56° N. 31° W., rare.

**Temperature:** for the northern Atlantic 6.7, mean of 34 obs., max. 19.<sub>8</sub>, min. — 1.5.<sup>1</sup> — North of South America 25.1 to 26.7.

**Salinity:** for the northern Atlantic 34.40, mean of 35 obs., max. 36.33, min. 30.98, exceptionally 26.51. — North of South America 32.62.

**Plankton-type.** This species is a decided arctic species, occurring most abundantly along the coasts and entering the Trichoplankton. Its occurrence north of S. America is therefore extremely interesting, especially as I could not find any difference between the tropical and arctic form. Occurs in Bering Sea. — *T*, *Ns*, *Ny*.

### COSCINODISCUS POLYCHORDUS GRAN.

(Den Norske Nordhavs-Expedition, 1876–1878, Protophyta pag. 30 Ph. II fig. 33. Pl. IV fig. 56.)

1898 *March*: 58° N. 6° E.

*May*: 72° N. 16° W.

*July*: S. of Iceland.

*October*: Färöes.

1899 *April* and *May*: Färöes.

<sup>1</sup> Only such samples considered as contained this species abundantly.

**Temperature:** 5.1, mean of 6 obs., max. 7.7, min. — 0.9

**Salinity:** 34.85, mean of 6 obs., max. 35.56, min. 34.40.

**Plankton-type.** The rare occurrence in the ocean indicates, that this species is of neritic habitat. — *Ny*, *Ns*, exceptionally *T*.

### COSCINODISCUS RADIATUS EHB.

(A. Schmidt Atlas Pl. LX fig. 9.)

1898 *January:* 20° N. 18° W., common; 48° N. 6° W.; 37° N. 73° W.

*March:* 21° N. 18° W.; 49° N. 22° W.

*April:* Färöes to 58° N. 1° W.

*May:* Färöes, common; 60°—61° N. 1° W.; 41° N. 56° W. rare.

*June:* 60° N. 1° W., rare.

*July:* Färöes not rare; 59° N. 2° W.

*August:* Färöes, rare.

*September:* 59° N. 1° W., rare.

*October:* Färöes, not rare; 59° N. 1° W.

*November:* Westmannaö, not rare; Färöes, not rare; 60° N. 1° W., rare; 51° N. 20° W., rare.

*December:* Färöes, common; 43° N. 61° W., common.

1899 *January:* Färöes, common; 47° N. 8° W., not rare; 45° N. 49° W. to 41° N. 69° W., more or less rare.

*February:* Färöes, common.

*March:* NE. of Iceland, from 66° N. 20° W. to 63° N. 9° W., varying from rare to common; Färöes, common.

*May:* 41° N. 56° W., rare.

*June:* 66° N. 10° W., rare.

*June:* 70° N. 13° W., not rare; 66°—67° N. 3°—10° W., rare; 62° N. 1° E., rare.

*July:* 74° N. 17° W., rare.

**Temperature:** 7.4, mean of 26 obs., max. 18, min. 0.7.

**Salinity:** 34.84, mean of 25 obs., max. 35.65, min. 31.96 (common).

**Plankton-type.** This form is evidently more neritic than pelagic and occurs in the Arctic Sea, abundantly at the Färöes, round Iceland and round Scotland. — *Ny* and *Ns*.

• **COSCINODISCUS (PLANKTONIELLA) SOL. WALLICH.**

(A. Schm. Atl. Pl. LVIII fig. 45.)

1898 *January*: 0° S. 29° W.; 16° N. 18° W.; 33° N. 31° W. to 16° N. 11° W.; 7° 11° N. 53°—52° W.; 35° N. 74° W.

*March*: 1° S. 15°—26° W.; area between the Azores, the E. Channel and 49° N. 33° W.; 32° N. 74° W.

*April*: area between the Azores, the Engl. Channel and 47° N. 40° W.; 31° N. 75° W.

*May*: area between Cape Finisterre, 44° N. 16° W., 43° N. 45° W. and 50° N. 14° W. (most common north of 45° N.); 44° N. 59° W.

*June*: 46°—50° N. 12° W., rare.

*October*: 57° N. 18° W., rare.

*November*: 0° S. 31° W.; area between 48° N. 29°—44° W. and 55°—56° N. 21°—23° W.

1899 *January*: 33° N. 15° W.; 48°—50° N. and 39°—20° W., rare.

*March*: 46° N. 11° W.

*April*: area between 44°—44° N. 15° W. and 42° N. 18° W.

*May*: 32° S. 13° E.

*June*: 20° S. 4° E. to 15° S. 5° E.

*October*: 52° N. 14° W.; 56° N. 23° W., rare.

*November*: 51° N. 13° W., rare.

**Temperature:** 15.5, mean of 72 obs., max. 27, min. 9.

**Salinity:** 35.80, mean of 56 obs., max. 36.61, min. 34.43; exceptionally 20.39 and 22.51.

**Plankton-type.** Noted from the Indian, Pacific, Mediterranean and Red Sea. It occurs in the Atlantic along the west coast of Africa, in March and April between the Azores and the E. Channel; advances in May beyond 45° N. From May rare or absent in that region. In September rare specimens had drifted towards Rockall. In November it reappeared between 48° N. and 56° N. It has been *rarely* seen in the western Atlantic, in the Florida current. — S.

**DACTYLIOSOLEN ANTARCTICUS** CASTR.<sup>1</sup>

(Challenger Exp. Diat. Pl. IX fig. 7).

*February*: 60° N. 3° W., very rare.*March*: 41° N. 21°—23° W. to 49° N. 18° W.*April*: area between 39° N. 24° W., 49° N. 9° W. and 47° N. 32° W.*May*: 48°—49° N. 29°—14° W.; area between 58° N. 23° W.; the Färöe Channel and 61° N. 1° 30' W.*June*: 60° N. 8° W. to 62° N. 2' 30" E.*July*: from 60° N. 23° W. along 59°—62° N. to 0° 20' W.*August*: 56° N. 34° W.; N. and S. of Iceland to the N. and S. of the Färöes and to the Shetlands.*September*: 56° N. 28° W. to 57° N. 14° W.; N. and S. of Iceland to the Färöes, the Shetlands and the Orkneys.*October*: S. of Iceland to 59° N. 3° W. and thence to 58° N. 32° W. and 56° N. 29° W.*November*: S. of Iceland to the Färöes and the Shetlands; 56° N. 23°—36° W.1899 *March*: 35° N. 16° W., rare; 47° N. 8° W., rare.*April*: 46° N. 13° W. and 48° N. 9° W., rare.*November*: 51° N. 13° W., rare.**Temperature**: 11.7, mean of 40 obs., max. 15.6, min. 7.**Salinity**: 35.37, mean of 34 obs., max. 35.94, min. 33.78.**Plankton-type.** This species is very characteristic for the Styli-plankton of the eastern and northern Atlantic. It occurs abundantly the Antarctic Ocean (Castrac.). — S.**DACTYLIOSOLEN HYALINUS** CL.

(K. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. VII fig. 33.)

1898 *January*: 34° N. 73° W.*February*: 34° N. 74° W.*March*: 41° N. 66° W. to 45° N. 36° W.<sup>1</sup> Ostenfeld's data used.

*April*: 42° N. 47° W. to 47° N. 40° W.

*May*: 41° N. 65° W. to 42° N. 43° W.

*June*: 42° N. 50° W. to 45° N. 41° W.

*October*: 40° N. 67° W.

*November*: 42—43° N. 64—61° W., not rare to common;  
47—48° N. 41° W., more or less rare; 51° N. 20° W.,  
common.

*December*: 41—42° N. 66—63° W., more or less rare.

1899 *February*: 32° N. 47° W.

**Temperature**: 14.1, mean of 32 obs., max. 20, min. 8.

**Salinity**: 35, mean of 27 obs., max. 36.49, max. 32.62.

**Plankton-type**. This species occurred as a rule associated with Styli-plankton. It appeared from February to June above the Newfoundland Banks, where it reappeared in November, as had the water, which contained this species, been covered by a sheet of another kind of water, that disappeared in November. — S.

### DACTYLIOSOLEN MEDITERRANEUS H. PERAGALLO.

(Le Diatomiste Pl. XIII fig. 8—9, the variety *tenuis* CL. included).

1898 *April*: 49° N. 23° W., rare.

*August*: Azores; 60° N. 2° W. (very rare) to 61° N. 10° W.  
(not rare); 63° N. 8° W.; 63—64° N. 25—27° W., rare.

*September*: 56° N. 28° W., rare; 59° N. 1° W.; 60° N. 4°  
and 10° W., very rare; Färöes, rare.

*October*: 57° N. 27° W. to 58° N. 35° W., rare; 60° N. 4°—6°  
W., rare.

*November*: Azores.

1899 *February*: 34° N. 40° W., rare.

*Marsch*: 47° N. 8° W., rare.

**Temperature**: 13.7, mean of 10 obs., max. 21.4, min. 9.8.

**Salinity**: 35.53, mean of 10 obs., max. 36.35, min. 34.72.

**Plankton-type**. Noted from the Gulf of Bengal, Mediterranean and the Red Sea. — S.

**DITYLUM BRIGHTWELLII** WEST.

(VAN HEURCK Syn. Pl. CXIV fig. 4 9).

1898 *March*: 23° N. 17° W.; 48° N. 6° W.*April*: 44° N. 15° W.; 48° N. 5° W.*August*: 55° N. 5° W.*January*: 41° N. 69° W.1899 *May*: 60° N. 4° W.**Temperature**: 10.5, mean of 7 obs., max. 17, min. 6.**Salinity**: 34.85, mean of 4 obs., max. 35.82, min. 34.16.**Plankton-type.** This species is very common in the English Channel, the North Sea and the Skagerak. Its rare occurrence in the Atlantic and the low salinity prove that it is a neritic form. Occurs in Puget's Sound. — *Nm.***DITYLUM SOL.**

(Tric. Sol. A. SCHMIDTS Atlas d. Diat. K. Pl. CLII fig. 4, 5, 7—9).

1898 *June*: 10° N. 53° W.**Temperature**: 27.2.**Salinity**: 36.01.**Plankton-type.** Noted from the Gulf of Bengal, Java, Hong-kong. — *Nt.*» **ETHMODISCUS SP.** » CASTR.

(Challenger Exp. Diat. Pl. XIV fig. 4).

1897 *December*: 32° N. 33° W.1898 *February*: 13°—16° N. 70°—71° W.*March*: 33° N. 32° W.*May*: 30° N. 42° W.*October*: 21° S. 36° W.1899 *January*: 55° N. 49° W.*April*: 28° N. 75° W.**Temperature**: 21.6, mean of 7 obs., max. 27, min. 12.**Salinity**: 36.10, mean of 4 obs., max. 37.21, min. 35.54.**Plankton-type.** Fragments only have been found of this species, remarkable for its fine and characteristic structure. — *D.*

**EUCAMPIA CORNUTA** CL. VAR.<sup>1</sup>

(Mölleria cornuta Cl. Bih. K. Sv. Vet. Akad. Handl. 1 n. 11 Pl. I fig. 6.)

1898 *March*: 21°—23° N. 18°—17° W.; 36° N. 39° W.; 41° N. 66° W.*August*: Azores.**Temperature**: 17.9, mean of 4 obs., max. 23.7, min. 15.**Salinity**: 35.51 (one obs.)**Plankton-type**: The type occurs in the Red Sea and at Java. S.**EUCAMPIA GRÖNLANDICA** CL.

Bih. Kongl. Sv. Vet. Ak. Handl. XXII. 3 No 4 Pl. II fig. 10.

1898 *May*: 67° N. 22° W.1899 *July*: 78° N. 53° E.; 74° N. 20° W.**Temperature**: —0.3 to 0.1.**Salinity**: 29.95 to 34.26.**Plankton-type**. Occurs in Baffin's Bay and, very rarely, in the fjords of W. Scotland and Scandinavia. — Ny.**EUCAMPIA ZODIACUS** EHR.

(VAN HEURCK Syn. Pl. XCV bis. fig. 1—4.)

1898 *March*: 49° N. 33° W. to 41° N. 60° W., in some spots common.*April*: 48° N. 29° W. to 40° N. 41° W.; 50° N. 3° W.*May*: 48° N. 33° W.; 41° N. 51° W.*June*: 44° N. 9° W., rare.*August*: 41° N. 65° W., very rare.*September*: 59°—60° N. 2° W., rare; 41° N. 65° W., very rare.

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<sup>1</sup> Atlantic specimens are much smaller than specimens from Java, exceedingly delicate, so they can scarcely be seen if not mounted dry. The diaphragms are more close than in the type. Longitudinal axis 0.08 to 0.08 sagittal 0.02, transv. axis 0.01 to 0.02 m. m. Perhaps a new species.



- November*: 43° N. 61° W. to 44° N. 68° W., as a rule rare.  
 1899 *February*: 34° N. 40° W., very rare.  
*May*: 50° N. 39° W., very rare.

**Temperature**: 14.5, mean of 24 obs., max. 26, min. 10.8.

**Salinity**: 35.19, mean of 17 obs., max. 36.85, min. 32.20.

**Plankton-type**. This species is of neritic habitat and occurs in the ocean only occasionally, as a rule in Styli-plankton. I have seen it in plankton from Jedo Bay, Japan, and from Puget's Sound.  
 — *Nm* (*S*).

### FRAGILARIA OCEANICA CL.<sup>1</sup>

(Bih. Kongl. Sv. Vetensk. Akad. Handl. 1 n. 13 Pl. XIV fig. 25).

- 1898 *May*: 70°—72° N. 13°—16° W.; 67°—68° N. 24°—17° W.; 63° N. 54° W.; 59° N. 49° W.  
*June*: 69° N. 54° W., very rare; 65° N. 31° W. to 66° N. 27° W.  
 1899 *May*: 75° N. 2° E.  
*June*: 80° N. 14° E., to 74° N. 20° E.  
*July*: 74°—75° N. 17°—20° W., very common; 70°—72° N. 21° W., not rare; 80° N. 12° (common) and 16° E. (rare).

**Temperature**: 0.8, mean of 25 obs., max. 6.4, min. —1.3.

**Salinity**: 33.91, mean of 18 obs., max. 34.93 min. 31.98, exceptionally 25.36.

**Plankton-type**. Typical arctic, neritic form. It occurs in the Hudson Bay. — *Ny*.

### FRAGILARIA STRIATULA LYNGB.

(VAN HEURCK Syn. Pl. XLIV fig. 12).

- 1899 *May—June*: 66° N. 22° W.

**Temperature**: 3.10.

**Salinity**: 34.10.

**Plankton-type**: *Ns*.

<sup>1</sup> Ostenfeld's data used.

**GOSSLIERIELLA TROPICA** SCHÜTT.

(VAN HEURCK Treatise on the Diatomacée pag. 513).

1897 *December*: and1898 *January*: 32° —34° N. 33° —30° W.; 35° N. 74° W., rare.*February*: 34° N. 73° W., rare.*December*: Azores, rare.*March*: 37° N. 26° W., very rare.**Temperature**: 18.8, mean of 6 obs., max. 20.9, min. 15.7.**Plankton-type.** My specimens were found in Styli- and Desmo-plankton intermingled. — *S?* *D?***GUINARDIA FLACCIDA** (CANTR.)<sup>1</sup>

(H. PERAGALLO Le Diatomiste Pl. XIII fig. 3—5)

1898 *January*: 16° —21° N. 18° —20° W.*March*: 21° N. 18° W.; 41° N. 60° W. to 42° N. 42° W.*April*: 47° —48° N. 40° —33° W.*May*: 42° N. 61° W., 48° N. 33° W.*August*: 63° N. 8° W. (very rare) to 58° N. 2° W. (common at 60° N. 3° W.)*September*: 59° N. 2° W. (rare); 60° N. 2° W. (common).*October*: 41° N. 67° W., not rare.*November*: 51° N. 20° W., common; 42° N. 64° W. to 47° N. 41° W., not rare.*December*: 18° N. 68° W., rare; 41° N. 66° W. to 43° N. 58° W.1899 *January*: 41° N. 69° W., not rare; 45° N. 49° W.**Temperature**: 12.8, mean of 25 obs., max. 26.8, min. 6.**Salinity**: 34.72, mean of 22 obs., max. 36.11, min. 31.96 (very common, when salinity 32.99).**Plankton-type.** Occurs in the Mediterranean, the North Sea and the Skagerak. — *Nm.*<sup>1</sup> Ostenfeld's data used.

**HEMIAULUS HAUCKII GRUN.**

(VAN HEURCK Synopsis Pl, CIII fig. 10.)

1897 *December*: and1898 *January*:  $17^{\circ}$ — $13^{\circ}$  S.  $38^{\circ}$ — $35^{\circ}$  W.;  $7^{\circ}$  N.  $53^{\circ}$  W. to  $29^{\circ}$  N.  $36^{\circ}$  W.*February*: Caribbean Sea.*March*:  $15^{\circ}$  N.  $49^{\circ}$  W.;  $22^{\circ}$  N.  $43^{\circ}$  W.;  $7^{\circ}$  N.  $55^{\circ}$  W.; Caribbean Sea;  $32^{\circ}$ — $37^{\circ}$  N.  $74^{\circ}$  W.*April*:  $10^{\circ}$  N.  $53^{\circ}$  W.  $15^{\circ}$  N.  $49^{\circ}$  W.; Caribbean Sea.*May*:  $17^{\circ}$  N.  $50^{\circ}$  W.;  $26^{\circ}$  N.  $52^{\circ}$  W.*June*:  $10^{\circ}$  N.  $53^{\circ}$  W.;  $22^{\circ}$  N.  $60^{\circ}$  W.;  $30^{\circ}$ — $33^{\circ}$  N.  $52^{\circ}$ — $48^{\circ}$  W.;  $41^{\circ}$  N.  $60^{\circ}$  W.*July*:  $26^{\circ}$  N.  $48^{\circ}$  W. to  $31^{\circ}$  N.  $39^{\circ}$  W.; Azores.*August*: Azores.*September*:  $33^{\circ}$  N.  $74^{\circ}$  W.; Azores.*October*:  $21^{\circ}$  S.;  $36^{\circ}$  W.*November*:  $18^{\circ}$ — $24^{\circ}$  S.  $31^{\circ}$ — $29^{\circ}$  W.;  $26^{\circ}$  N.  $48^{\circ}$  W.;  $42^{\circ}$  N.  $63^{\circ}$  W.;  $45^{\circ}$  N.  $7^{\circ}$  W.*December*:  $14^{\circ}$  S.  $36^{\circ}$  W.;  $18^{\circ}$  N.  $67^{\circ}$  W.1899 *January*:  $33^{\circ}$ — $34^{\circ}$  N.  $15^{\circ}$ — $12^{\circ}$  W.*March*:  $35^{\circ}$  N.  $16^{\circ}$  W.*April*:  $32^{\circ}$  N.  $75^{\circ}$  W.*June*:  $21^{\circ}$  N.  $45^{\circ}$  W.*July*:  $23^{\circ}$  N.  $36^{\circ}$  W.**Temperature**: 23.4, mean of 48 obs., max. 28, min. 9.s.**Salinity**: 36.55, mean of 28 obs., max. 37.43, min. 34.88.**Plankton-type.** Occurs in the Mediterranean, Pacific and Indian Ocean. — *D.***HEMIAULUS HEIBERGII CL.**

(Bih. K. Sv. Vet. Akad. Handl. Vol. I n. 11 Pl. I fig. 7.)

1898 *January*:  $6^{\circ}$  N.  $55^{\circ}$  W.;  $25^{\circ}$  N.  $74^{\circ}$  W.*February*:  $26^{\circ}$  N.  $74^{\circ}$  W.

*March*: 7° N. 55° W.

*June*: 10° N. 53° W.

**Temperature**: 24.8, mean of 5 obs., max. 27.2, min. 21.6.

**Salinity**: 36.01 (one obs.).

**Plankton-type**. Noted from the Gulf of Guinea, the Mediterranean, the Red Sea, Gulf of Bengal, Java and Japan. — *N. D.*

### HEMIDISCUS CUNEIFORMIS WALLICH.

(Microsc. Journ. Vol. VIII, 1860 Pl. II fig. 3-4. *Enodia arcuata* SCHNÖDER.)

1897 *December* and

1898 *January*: 46° N. 11° W. to the Azores; 12° N. 50° W.

*February*: Caribbean Sea; 34° N. 74° W.

*March*: 36° N. 29° W.; Caribbean Sea.

*April*: Caribbean Sea.

*May*: 48° N. 25° W.; 43° N. 11° W.; Azores; 23° N. 56° W.

*June*: 48° N. 33° W.; Azores; 31° N. 17° W.; 19° N. 63° W.

*July*: 49° N. 22° W.; Azores; Caribbean Sea.

*August*: Azores; 44°—42° N. 42°—50° W.; Caribbean Sea.

*September*: Azores; 66° N. 18° W., very rare; 9° N. 53° W.

*October*: 21° S. 36° W.; Azores; 56° N. 31° W.; 57° N. 18° W.; Caribbean Sea.

*November*: Azores; 56° N. 23° W.

*December*: 29° S. 49° W.; Azores; 18° N. 67° W.

1898 *January*: 45° N. 49° W.

*February*: 34° N. 40° W.

*April*: 46° N. 13° W.; 41° N. 17° W.

*October*: 56° N. 31° W.

**Temperature**: 20.3, mean of 53 obs., max. 28.2, min. 10.8, exceptionally 7.

**Salinity**: 35.56, mean of 34 obs., max. 36.59, min. 32.96.

**Plankton-type**. Occurs in the Mediterranean and Indian Ocean. This species belongs to the Styli-plankton of the western and eastern warmer Atlantic. It occurs beyond 50° N. as rare specimens only and was in September seen N. of Iceland. — S.

## LAUDERIA ANNULATA CL.

(A Treatise on the Phyto-plankton Pl. II fig. 13—15.)

1898 *January*: 21° N. 17° W.*March*: 23°—25° N. 17°—16° W.; Azores; 7° N. 55° W.; 41° N. 70°—60° W.*April*: 44° N. 15° W.; 48° N. 33° W.*May*: 48° N. 33° W.; 49° N. 23° W.; 60° N. 3° E.*June*: 42° N. 9° W.*August*: 58° N. 2° W.; 62° N. 6° W.*September*: 50° N. 3° W.; 59° N. 1° W.*December*: 51° N. 20° W.1899 *January*: 45° N. 49° W.; 41° N. 69° W.*May*: 60° N. 1° E.**Temperature**: 13.<sub>3</sub>, mean of 18 obs., max. 25.<sub>9</sub>, min. 6.**Salinity**: 35.<sub>12</sub>, mean of 14 obs., max. 35.<sub>95</sub>, min. 32.<sub>41</sub>.**Plankton-type**. Occurs in the Mediterranean, the Indian and Pacific Ocean. — S. (Nm).LAUDERIA FRAGILIS GRAN.<sup>1</sup>

(Bibliotheca botanica Heft. 42. Pl. I fig. 12—14.)

1898 *May*: 72°—70° N. 14° W.; 68°—67° N. 17°—22° W.; 66° N. 24° W.; 59° N. 49° W.*June*: 66° N. 27° W. to 67° N. 29° W.; 69° N. 49° W.; 63° N. 56° W.1899 *May*: 75° N. 2°—30° E.*July*: 80° N. 12° E.; 74°—75° N. 20°—18° W.; always rare.**Temperature**: 0.<sub>9</sub>, mean of 12 obs., max. 8.<sub>5</sub>, min. —1.<sub>5</sub>.**Salinity**: 33.<sub>90</sub>, mean of 12 obs., max. 34.<sub>98</sub>, min. 29.<sub>95</sub>.**Plankton-type**: Ng.<sup>1</sup> Ostenfeld's data used.

**LEPTOCYLINDRUS DANICUS** CL.

(Bih. K. Sv. Vet. Akad. Handl. Vol. XX 3 n. 2 Pl. II. fig. 4. 5.)

1898 *May*: 45° N. 43° W.; Färöes, very common; 58° N. 4° E., common; 63° N. 5° E., common.

*June*: Färöes, common.

*July*: Färöes, rare.

*August*: 80°—81° N. 10°—23° E., rare,

1899 *May*: Färöes, rare; 62° N. 2° E., common; 58° N. 4° and 7° E., common; 59° N. 2° E., rare.

*September*: 75° N. 17° E. to 79° N. 11° E. and 80° N. 13° E., varying from rare to common.

**Temperature**: 7, mean of 20 obs., max. 11.7, min. 3.8.

**Salinity**: 34.62, mean of 20 obs., max. 36.01, min. 32.70.

**Plankton-type**. This species seems to have a station at the Färöes, whence it spreads across the North Sea to Norway and Skagerak. It is remarkable that it was found abundantly in October 1895 off Coruña and in July at Trouville. SCHRÖDER mentions it from Naples. — *Ns.*

**LITHODESMIUM UNDULATUM** EHB.

(VAN HEURCK Syn. Pl. CXVI f. 8—11.)

1898 *October*: 42° N. 59° W.

*November*: 43° N. 58° W. to 40° N. 67° W.

**Temperature**: 11 to 18.

**Salinity**: 33.01 to 33.42.

**Plankton-type**. Noted from the coasts of France, the Engl. Channel and the southern North Sea. I have seen some specimens from Cameroons. — *Nm.*

**MELOSIRA (NUMMULOIDES VAR.) HYPERBOREA** GRUN.

(VAN HEURCK Syn. Pl. LXXXV fig. 4.)

1899 *June*: 64° N. 7° W.

*July*: 74°—75° N. 17°—18° W.

**Temperature:** —0.5, mean of 3 obs., max. —0.1, min. —0.6.

**Salinity:** 33.10, max. 33.78, min. 32.65.

**Plankton-type.** Found at E. and W. Greenland, in Hudson Bay, Barent's Sea and the Baltic. — *Ng.*

### NAVICULA MEMBRANACEA CL.

(A Treatise on the Phyto-plankton Pl. II fig 25—28.)

1898 *March:* 21° N. 18° W.; 43° N. 48° W.; 42° N. 66° W.

*April:* 29° N. 24° W.

*November:* 42° N. 64° W.

**Temperature:** 15.2, mean of 5 obs., max. 17.6, min. 13.

**Salinity:** 35.47 and 35.51.

**Plankton-type.** I have seen this species in samples from the Red Sea. LEMMERMANN mentions it from New Zealand. — *S.*

### NAVICULA SEPTENTRIONALIS OESTRUP.<sup>1</sup>

(Marine Diatomées fra Östgrönland Kohn. 1895 Pl. VIII f. 97.)

1898 *June:* 69° N. 54° W.

1899 *May:* 75° N. 2° 30' E.

*July:* 74° N. 20° W.

**Temperature:** —1 to 3.1.

**Salinity:** 29.95 to 34.93.

**Plankton-type.** Noted from E. and W. Greenland and the Baltic. — *Ng.*

### NITZSCHIA DELICATISSIMA CL.<sup>1</sup>

(A Treatise on the Phyto-plankton. Pl. II fig. 22.)

1898 *April:* 59° N. 22°—28° W., common.

*May:* 59° N. 13°—15° W.; Färöes, common; 57°—60° N. 28° W.; 60°—58° N. 31°—35° W., common.

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<sup>1</sup> Ostenfeld's data used.

*June*: Färöes, rare to common; Denmark's Sound, common.

*July*: Färöe Channel; 60—58° N. 23°—32° W.; common.

*August*: Westmannaö, common; 65° N. 33° W., not rare.

*September*: Färöes, very common; 64° N. 32° W., common;  
64° N. 31° W., rare.

**Temperature**: 8.6, mean of 15 obs., max. 11. min. 5.5.

**Salinity**: 34.98, mean of 15 obs., max. 35.13, min. 34.65.

**Plankton-type**. The abundant occurrence of this species in the spring in the northern Atlantic makes it probable that it belongs to the Chæto-plankton. — C.?

### NITZSCHIA FRIGIDA GRUN.

GRUN Bibliotheca botanica Heft. 42 Pl. I fig. 11.)

1899 *July*: 74—75° N. 20—18° W., rare.

**Temperature**: —0.3 to —0.6.

**Salinity**: 29.95.

**Plankton-type**. Noted from E. and W. Greenland, Barent's Sea, Kara Sea and the Baltic (Bay of Finland, Aland). — Ng.

### NITZSCHIA LINEOLA CL.

(Fifteenth annual report of the Fishery Board for Scotland, for 1896  
pag. 300 fig. 11.)

1898 *March*: Azores; 41° N. 23° W.; 44° N. 17° W.

*April*: Azores; 50° N. 9° W.; 49° N. 22—25° W.

*August*: Azores.

**Temperature**: 14.8, mean of 7 obs., max. 23.7, min. 11.2.

**Salinity**: 35.10, mean of 4 obs., max. 35.87, min. 35.17.

**Plankton-type**: S

### NITZSCHIA PUNGENS GRUN.

CLEVE A Treatise on the Phytoplankton Pl. II fig. 23.)

1898 *March*: 7° N. 55° W.

*June*: 10° N. 53° W.



**Temperature:** 25.9 and 27.2°

**Salinity:** 36.01, one obs.

**Plankton-type.** Noted from Japan and the Gulf of Bengal.  
— *N.*

### NITZSCHIA PUNGENS VAR. ATLANTICA CL.

A Treatise on the Phyto-plankton Pl. II fig. 24.)

1899 *April:* 48° N. 9° W.

**Temperature:** 12.4.

**Salinity:** 35.66.

**Plankton-type:** Noted from Coruña and the Red Sea. LEMMERMANN mentions it from the Pacific. — *S.*

### NITZSCHIA SERIATA CL.<sup>1</sup>

(Vega expeditionens Vetenskapl. iakttagelser Pl. XXXVIII fig. 75 — *N. fraudulenta* CL., Fifteenth annual report of the Fishery Board for Scotland, for 1896, pag. 300 fig. 11, included.)

1898 *March:* Azores, rare; 41° N. 21° W.; 43° N. 48° W.

*April:* Azores; 49° N. 19°–23° W.; Orkneys, rare; 59° N. 22°–28° W.

*May:* 49° N. 23° W.; 60° N. 9° W. to 57°–59° N. 28° W., not rare, in some spots common.

*June:* 57° N. 34° W., rare; from S. Iceland to the Färöes, where very common, and Scotland.

*July:* S. Iceland, rare; Färöes, rare; 58° N. 32° W., not rare.

*August:* Azores, more or less rare; Westmannaö, rare; 63° N. 25° W. to 65° N. 33° W., more or less rare.

*September:* 66° N. 18°–30° W., rare; Shetlands, rare; 64° N. 31°–32° W.; 68° 46' N. 53° W.

*October:* 61°–63° N. 5°–10° W., rare.

1899 *April:* Färöes, rare.

*May:* Westmannaö, rare; Färöes, rare.

*September:* 75° N. 17° E. to 81° N. 16° E., more or less common.

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<sup>1</sup> Ostenfeld's data used.

**Temperature:** 8.8, mean of 26 obs., max. 21.4, min. 1.9

**Salinity:** 35.11, mean of 26 obs., max. 36.28, min. 33.58.

**Plankton-type.** This principal area of distribution is between Scotland, Iceland and Greenland, which together with the mean salinity seems to prove that it belongs to the Chæto-plankton. The var. *N. fraudulenta* is noted from the Mediterranean. — *C.*

### PERAGALLOA MERIDIANA SCHÜTT.

(VAN HEURCK: A Treatise on the Diatomaceæ pag. 419. — *Peragallia tropica* SCHÜTT Engl. & Prantl. D. nat. Pflanzenfamilien 1, 1. b: pag. 86.

1898 *February:* 12° N. 71° W.

*October:* 21° S. 36° W.

**Temperature:** 27 to 22.

**Salinity:** 37.21 (one obs.).

**Plankton-type:** *D* or *N*.

*Remark.* SCHÜTT does not say anything about the habitat of this form, but VAN HEURCK indicates the Baltic, which must be erroneous. It seems to me questionable whether this form not be an anomalous *Chaetoceros peruvianus*.

### RHIZOLENIA (TEMPEREI VAR.) ACUMINATA PERAGALLO.

(Le Diatomiste 1892 Pl. XV fig. 4.)

1898 *January:* 7° N. 53° W.

*February:* 5° S. 9° E.

*October:* Azores.

*November:* Rio Janeiro; Azores.

*December:* Azores.

1899 *June:* 14° S. 6° W.

**Temperature:** 23.6, mean of 7 obs., max. 29.3, min. 17.2.

**Salinity:** 35.19, mean of 4 obs., max. 36.68, min. 33.81.

**Plankton-type.** This form, which is noted also from the Mediterranean and the Pacific, occurs along the coasts of the tropical Atlantic, east and west. — *N*.

**RHIZOLENIA ALATA** Btw.<sup>1</sup>(Peragallo: *Le Diatomiste* Pl. XVII fig. 11.)1897 *December* and1898 *January*: 20°—21° N. 18°—20° W.; 31° N. 33° W.; 42° N. 18°—21° W.; 46° N. 11° W.; 35° N. 74° W.*February*: 13°—15° N. 70°—71° W.*March*: 23°—25° N. 17°—16° W.; area between 36° N. 28° W., 45° N. 13° W. and 48° N. 18° W.; 0° 30' S. 26° W.; 28° N. 74° W.*April*: area between the Azores, the English Channel and 48° N. 33° W.; 60° N. 4° and 19° W.; Caribbean Sea.*May*: 38° N. 21° W.; 40° N. 16° W.; 48° N. 29° W.; 60° N. 31° W. and 57° N. 28° W. to the Orkneys; 45° N. 44° W. to 41° N. 56° W.*June*: 46° N. 24° W.; 47° N. 17° W.*July*: 50° N. 11° W.; 59° N. 23° W., common, thence rare to 62° N. 0° W.*August*: 56° N. 34°—28° W., common; area between 62° N. 18° W., 65° N. 36° W. and 59° N. 2° E., common; 65° N. 36° W.*September*: area between 56° N. 28°—19° W., the Shetlands and 60° N. 26° W., as a rule common; 66° N. 18° W., rare.*October*: 56° N. 29° W. and 63° N. 16° W., common, thence to the Shetlands.*November*: 56° N. 23°—17° W., not rare; 62° N. 13° W., not rare; Färöe Channel, rare; 40° N. 67° W., rare.*December*: 32° N. 33° W.; 43° N. 18° W.1899 *February*: 34° N. 40° W., rare.*March*: Azores; 46°—47° N. 11°—8° W.*April*: 30° S. 2° E.; 9° N. 59° W.*May*: 60° N. 1° E., rare.*June*: 4° S. 19° W., common.*July*: 62° N. 0° W., not rare.*August*: 55° N. 26° W., not rare.*September*: 56° N. 30°—33° W., rare.<sup>1</sup> Ostenfeld's data used.

*October*: 53° N. 31° W., rare.

*November*: 51° N. 13° W., rare.

**Temperature**: 11.<sub>9</sub>, mean of 31 obs., max. 26.7, min. 5.1

**Salinity**: 35.<sub>89</sub>, mean of 29 obs., max. 35.<sub>89</sub>, min. 34.<sub>92</sub>.<sup>1</sup>

**Plankton-type**. Noted from the Mediterranean, the Indian and Pacific Ocean. It follows in the Atlantic the African coast to the Azores and spreads in the spring towards the English Channel. It reached in May 60° N. and Scotland, in August S. Iceland, in September N. Iceland. From S. Iceland it crossed Denmark's Sound for E. Greenland. It occurred also in the western Atlantic, but was there much rarer. — S.

### RHIZOLENIA ARAFURENSIS CASTR.

(H. Peragallo: *Le Diatomiste* 1892 Pl. XV fig. 6.)

*March*: 45° N. 36° W., rare.

**Temperature**: 8.

**Salinity**: 35.<sub>65</sub>.

**Plankton-type**. Found in the Arafura Sea.— *D* ? *S* ?.

### RHIZOLENIA ATLANTICA PERAGALLO.<sup>1</sup>

(*Le Diatomiste* 1892 Pl. XVII fig. 4—5.)

1898 *March*: 42° N. 42° W. to 41° N. 49° W.

*November*: 24° N. 29° W., common; 51° N. 20° W.; 42° N. 64° W.

*December*: 18° N. 67° W.

1899 *February*: 34° N. 40° W.

**Temperature**: 11 to 22.<sub>9</sub>, exceptionally 26.<sub>8</sub>.

**Salinity**: 35 to 36.<sub>35</sub>.

**Plankton-type**: S.

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<sup>1</sup> Only such samples in which this species occurred in some abundance have been considered in calculating the means.

**RHIZOSOLENIA BERGONII** H. PER.

(Le Diatomiste 1892 Pl. XV fig. 5).

1898 *November*:  $24^{\circ}$  S.  $29^{\circ}$  W.1899 *March*:  $47^{\circ}$  N.  $8^{\circ}$  W.**Temperature**: 11.5 to 22.9.**Salinity**: 35.73 to 36.69.**Plankton-type**. Noted from the Mediterranean. — *D.* (S?)**RHIZOSALENIA CALCAR AVIS** SCHULZE.

(H. PERAGALLO: Le Diatomiste 1892 Pl. XVI fig. 9).

1898 *January*:  $7^{\circ}$  N.  $53^{\circ}$  W.;  $35^{\circ}$  N.  $74^{\circ}$  W.*February*:  $5^{\circ}$  S.  $4^{\circ}$  E.;  $13^{\circ}$  N.  $70^{\circ}$  W.*March*:  $7^{\circ}$  S.  $55^{\circ}$  W.;  $28^{\circ}$  N.  $74^{\circ}$  W.*April*:  $7^{\circ}$  N.  $55^{\circ}$  W.*June*:  $10^{\circ}$  N.  $53^{\circ}$  W.*November*:  $48^{\circ}$  N.  $41^{\circ}$  W.;  $42^{\circ}$  N.  $64^{\circ}$  W. to  $40^{\circ}$  N.  $67^{\circ}$  W.*December*:  $18^{\circ}$  N.  $67^{\circ}$  W.;  $41^{\circ}$  N.  $66^{\circ}$  W.;  $18^{\circ}$  N.  $67^{\circ}$  W.**Temperature**: 19.4, mean of 15 obs., max. 28, min. 10.**Salinity**: 34.77, mean of 7 obs., max. 36.01, min. 33.11.**Plankton-type**. This species is to be considered as a neritic form of the tropical and subtropical Atlantic, which however spreads along the European coast into the E. Channel, the southern part of the North Sea and the Skagerak. Occurs in the Mediterranean. — *Nm* (*Nt*).**RHIZOSOLENIA CASTRACANEI** PERAGALLO.

(Le Diatomiste 1892 Pl. XIV fig. 4).

1897 *December*: and.1898 *January*:  $24^{\circ}$  N.  $40^{\circ}$  W.  $32^{\circ}$  N.  $33^{\circ}$  W.  $36^{\circ}$  N.  $27^{\circ}$  W.;  $35^{\circ}$  N.  $74^{\circ}$  W.*February*:  $48^{\circ}$  N.  $40^{\circ}$  W.;  $16^{\circ}$  N.  $71^{\circ}$  W. to  $34^{\circ}$  N.  $74^{\circ}$  W.

*March*: 12° N. 51° W.; 15° N. 49° W.; 36° N. 30° W.; 43°—45° N. 41°—36° W.

*May*: 20°—23° N. 60°—56° W.

*June*: 24° N. 58° W.

*August—September*: Azores.

*October*: 21° S. 36° W.; Azores.

*November*: area between Rio Janeiro, 19° S. 31° W. and 24° S. 29° W.; Azores; 44° N. 55° W.

*December*: 29° S. 49° W.; Azores.

1899 *January*: 45° N. 49° W.

*February*: 34° N. 40° W.

**Temperature**: 20.1, mean of 33 obs., max. 27.1, min. 8.

**Salinity**: 35.87, mean of 17 obs., max. 37.26, min. 32.87.

**Plankton-type**. This species occurs in the Mediterranean and belongs to the tropical Atlantic, east of South America, and follows the North Equatorial current into the Caribbean Sea, the Florida Current to Newfoundland Banks and the Azores. It occurs also in the Sargasso Sea. — *D.*

### RHIZOSOLENIA (ALATA VAR.) CORPULENTA CL.<sup>1</sup>

(A. Treatise on the Phyto-plankton Pl. II fig. 11.)

1898 *February*: 5° S. 8° E.

*March*: 7° N. 35° W.; 43° N. 48° W. to 45° N. 36° W.

*April*: 47° N. 39° W. to 49° N. 22° W.

*May*: 49° N. 23° W.; 43° N. 45° W. to 41° N. 63° W.

*June*: 10° N. 53° W.; 45° N. 41° W.

*August*: 63° N. 25° W., very rare.

*September*: 64° N. 32° W.; 41° N. 65° W.

*October*: 63° N. 16° W., rare; 57° N. 27° W. to 59° N. 16° W., common at 16°—21° W.

*November*: 63° N. 13° W.; 56° N. 30° W.; 43° N. 61° W. to 47° N. 41° W.

*December*: 62° N. 10° W.

<sup>1</sup> Ostenfeld's data used.

**Temperature:** 15.7, mean of 26 obs., max. 27.3, min. 7.

**Salinity:** 35.36, mean of 24 obs., max. 36.33, min. 32.96.

**Plankton-type.** Occurs in plankton from Jedo Bay, Japan. — S.

### RHIZOSOLENIA CYLINDRUS CL.<sup>1</sup>

(A Treatise on the Phyto-plankton Pl. II fig. 12).

1897 *December:* and

1898 *January:* 12° N. 50° W.; Caribbean Sea; 25° N. 74° W.

*February:* Caribbean Sea.

*March:* 3° N. 24° W.

*April:* 10° N. 53° W.

*May:* Caribbean Sea; 41° N. 56° W.

*July:* 24° N. 54° W.; 40° N. 67°—58° W.

*August:* 40° N. 66° W. to 42° N. 50° W.

*September:* 9° N. 53° W.; Caribbean Sea.

*October:* Caribbean Sea; 34° N. 74° W.

*December:* Caribbean Sea.

**Temperature:** 25.3, mean of 20 obs., max. 28.4, min. 19.8.

**Salinity:** 34.95, mean of 13 obs., max. 36.38, min. 33.20.

**Plankton-type.** This species has been seen once in the Guinea Current; else it seems confined to the sea along the north coast of South America, the Caribbean Sea and Florida Current. In July, August it follows the Desmo-plankton between 67°—50° W. beyond 40° N. The low mean salinity indicates it as a more neritic than oceanic form. SCHRÖDER mentions it from Naples. — N<sup>1</sup> (of the western Atlantic).

### RHIZOSOLENIA DELICATULA CL.

(Kongl. Sv. Vet. Akad. Handl. Vol. XXXII n. 8 pag. 28).

1898 *March:* 58° N. 6° E.

*August:* Azores.

**Temperature:** 6 to 23.7.

<sup>1</sup> Ostenfeld's data not used.

**Salinity:** 34.59.

**Plankton-type.** This species appeared in the Engl. Channel in April and November, in the southern North Sea in August and September, also in the Skagerak. — *Nm.*

### RHIZOSOLANIA (ALAFI VAR.) GRACILLIMA CL.<sup>1</sup>

(PERAGALLO: *Le Diatomiste* 1892 Pl. XVII fig. 12.)

1897 *December:* and

1898 *January:* 7° N. 53° W.; 25° N. 74° W.; 36° N. 27° W. to 45° N. 13° W.

*February:* 5° S. 4° E.; Caribbean Sea; 34° N. 73° W.

*March:* 4°—6° S. 10°—4° W.; 7°—10° N. 55°—53° W.; 36° N. 74° to 41° N. 66° W.; area between 33° N. 32° W., 43° N. 41° W. and 49° N. 18° W.

*April:* 7° N. 55° W.; 47° N. 40° W. to 50° N. 3° W.

*May:* 42° N. 60° W. to 45° N. 42° W. (common); 34° N. 32° W.; 38° N. 21° W.; 50° N. 7° W.

*June:* 10° N. 53° W.; 33° N. 48° W.; Azores; 42° N. 9° W., rare; 48° N. 6° W. very abundant; 45° N. 42° W.

*July:* Azores; 48° N. 14° W.; 77° N. 7° E., common; 40° N. 67° W., rare.

*August:* Azores; 59°—61° N. 3° W.—5° E.; 58° N. 5° E., very common; 76° N. 9° E. (common) to 80° N. 11° E. and 81° N. 24° E.

*September:* 50° N. 9°—11° W., common; 60° N. 11°—2° W.; 73° N. 19° E., rare.

*October:* 38° N. 73° W., common.

*November:* 47° N. 41° W. (rare).

*December:* 62° N. 10° W., common.

1899 *February:* 34° N. 40° W., rare.

*May:* 50° N. 39° W., rare; 58° N. 3° E., not common.

*June:* 68° N. 12° W., rare; 71° N. 6° W., rare.

*July:* 62° N. 0° W., very common.

*August:* 60°—61° N. 3°—0° W., common.

<sup>1</sup> Ostenfeld's data used.



*September*: 62° N. 1° E., very common; 65° N. 1° W., very common (deep sea haul from 100—0 m., maximum at 50 m.) 66°—67° N. 2°—3° W., not common or rare.

**Temperature**: 14.1, mean of 16 obs., max. 21.4, min. 5.3 (only such observations considered as relate to samples containing this form abundantly).

**Salinity**: 34.78, mean of 14 obs., max. 36.25, min. 30.62.

**Plankton-type**. I have found this form in samples from the Red Sea. It occurs more or less sparingly in the Equatorial, Antilles and Florida Currents. Its principal area of distribution is the area between the Azores, the west coast of Europe and the Färöe Channel. I never found it abundantly in the North Sea, but in the Skagerak and along the Scandinavian coast it occurs during the summer in great abundance. As it occurred in September 1899 very abundantly in the deeper water-layers at 62°—65° N. 1° E. — 1° W., there is reason to believe that it arrives into the Skagerak through the »Norske Rende». It seems thus to follow the 200 metre plateau round the French and British coasts. In some years it precedes so far as off Beeren Island, where it was found abundantly in September 1896. — *Nm*, *S*.

### RHIZOLENIA GRACILIS H. L. SMITH?<sup>1</sup>

(PERAGALLO: *Le Diatomiste* 1892 Pl. XVI fig. 17.)

1898 *August* and *November*: Azores, abundant.

**Temperature**: 18.5.

### RHIZOLENIA HEBETATA BAIL.

(PERAGALLO: *le Diatomiste* 1892 Pl. XVII fig. 10).

1898 *March*: 61° N. 5° W.

*April*: 50° N. 10° W.

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<sup>1</sup> Seems to be a dwarf-form of *R. setigera*.

*August:* 77°–76° N. 12°–8° E., in some spots common.

*September:* 76° N. 13° E. to 75° N. 17° E., not rare.

*November:* 45° N. 52° W.; 52° N. 38° W.; 53° N. 50° W.

*December:* 50° N. 9° W.; 48° N. 40° W.

1899 *March:* 49° N. 9° W.

**Temperature:** 7.8, mean of 17 obs., max. 12, min. 5.34.

**Salinity:** 34.88, mean of 17 obs., max. 35.65, min. 32.68.

**Plankton-type.** The distribution is very remarkable, first for the by no means rare occurrence in the arctic and northern Atlantic in 1898 and its total absence there in 1899, secondly for its absence in the temperate Atlantic. It is found in the Tricho-plankton of the Bering Sea. There is thus reason to believe that it derives ultimately from the northern Pacific. — *T.*

### RHIZOSOLENIA OBTUSA HENSEN.<sup>1</sup>

(*R. obata var. truncata* GRAN. D. Norske Nordhavs-Expedition, 1876–78, Proto-phyta Pl. V fig. 41).

1898 *March:* 58° N. 6° E.; 41° N. 60° W.

*April:* 63° N. 18° W.; 66° N. 24° W., not rare.

*May:* 70°–72° N. 13°–14° W.; Färöes rare to very common; Shetlands, rare; 60°–62° N. 2°–3° E., not rare; 61° N. 11° W., very rare; 57° N. 25° W., rare; 58°–60° N. 35°–38° W., 59° N. 49° W. and 63° N. 54° W.

*June:* 69° N. 15° W.; Denmark's Sound; 62° N. 14° W.; Färöes, very common; 62° N. 2° E.; SE. of Beeren Island.

*July:* Färöes, rare; 78° N. 5° E.

*August:* 77°–78° N. 11°–12° E., rare to common.

*September:* Färöes, common; 59° N. 50° W. and 69° N. 53° W., rare; 76° N. 13° E.

*December:* 44° N. 66° W.

1899 *March:* 49° N. 9° W., rare.

*April:* Westmannaö, rare.

*May:* 61°–62° N. 1°–2° E., rare.

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<sup>1</sup> Ostenfeld's data used.

*June*: 65° N. 1° W. to 69° N. 13° W., at some spots common;  
72° N. 9° W., rare; 73° N. 4° W., rare; 77° N. 14° E. and  
62° N. 2° E., rare.

*September*: 80° N. 13° E., very rare.

**Temperature**: 6.2, mean of 43 obs., max. 13.5, min. —1.3.

**Salinity**: 34.95, mean of 42 obs., max. 35.65, min. 31.98, exceptionally 26.51.

**Plankton-type**. SCHRÖDER mentions it from Naples. — *T*.

### RHIZOLENIA ROBUSTA NORM.

(PERAGALLO: le Diatomiste Pl. XIV fig. 1).

1898 *January*: 12° N. 19° W.; 21° N. 17° W.

*February*: 5° S. 9° E.; 13° N. 70° W.

*March*: 18° N. 16° W.; 21° N. 18° W.; 23° N. 17° W.; 10°  
N. 53° W.

*April*: 50° N. 3° W.

1899 *April*: 9° N. 59° W.

*June*: 4° S. 19° W.

**Temperature**: 21, mean of 11 obs., max. 27.3, min. 12.

**Salinity**: 34.93, mean of 3 obs., max. 35.60, min. 33.93.

**Plankton-type**. Noted from the Mediterranean, Java and the Pacific. It occurs in the tropical Atlantic, both west of Africa and north of South America and seems to be of neritic habitat. — *Nt*.

### RHIZOLENIA SEMISPINA HENSEN.<sup>1</sup>

(Fünfte Ber. Komm. in Kiel für 1882—86 Pl. V fig 39).

1898 *January*: 33° N. 31° W., rare; 48° N. 6° W., rare.

*March*: 48° N. 18° W.; 53° N. 20° W.; 48° N. 6° W. to 41°  
N. 21° W.; 43° N. 45° W. to 40° N. 71° W.

*April*: 73° N. 5° W., not rare; Färøe Channel, not rare; 60°  
N. 19° W. to 59° N. 30° W.; rare at the south end of Green-  
land; 44° N. 40° W. to 40° N. 70° W.

<sup>1</sup> Ostenfeld's data used.

*May*: 78° N. 2° 30' W. to 68° N. 17'—21° W., more or less rare; from S. Iceland to Scotland, not common; Shetlands, abundant; 61° N. 23° W. to the S. of Greenland, common; 63° N. 54° W., not common; 38° N. 21° W.; 49° N. 23° W. to 41° N. 54° W.

*June*: 69° N. 15° W. to 65° N. 31° W., not common; S. Iceland to Scotland; 62° N. 2° 30' E.; from Cape Farewell (common) to 66° N. 55° W. (rare); 45° N. 41° W.; 41° N. 58° W.

*July*: 61° N. 6° W., rare; 57° N. 47° W., common.

*August*: Azores, rare; Irish Channel, rare; Färöe Channel; Spitzbergen, 77° N. 12°—23° E., common; SW. of Iceland, rare; E. Greenland, 65° N. 35°—36° W.

*September*: very sparingly SW. of Cape Farewell and W. of Greenland, 66° N. 55° W.; 59° N. 1° W., not rare.

*October*: S. of Iceland.

*November and December*: Azores, rare.

1899 *March*: 65° N. 24° W., rare; 49° N. 9° W., common.

*April*: 49° N. 7° W., common; 48° N. 9° W., rare.

*May*: 72° N. 5° W., rare; Westmannaö, not common; 61° N. 6° W., not rare; 61° N. 1° E. rare; 58° N. 4° E., rare; 51° N. 26° W., rare; 50° N. 39° W., rare; 48° N. 45° W. and 47° N. 50° W., very common; 47° N. 57° W., rare; 75° N. 2° E.

*June*: area between 76° N. 9° W., 69° N. 13° W., 67° N. 6° W. and 68° N. 3° W. varying from rare to common; 62° N. 1°—2° E., rare; 75° N. 17° E. to 77° N. 14° E., more or less rare.

*July*: 79° N. 10° E. to 80° N. 14° E., very rare; 73° N. 36° E.

*August*: 76° N. 41° E. common.

*September*: Beeren Island, rare to common.

**Temperature**: 7, mean of 38 obs., max. 16, min. —1.2 (only such samples considered as contained this species abundantly).

**Salinity**: 34.77, mean of 39 obs., max. 35.94, min. 31.77.

**Plankton-type**: I have found this species in samples from Hudson Bay. — *T*

**RHIZOLENIA SETIGERA** Btw.

(Cl. Fifteenth annual report of the Fishery Board for Scotland, for 1896, pag. 301 fig. 12).

1898 *March*: 7° N. 55° W., common; 44° N. 21° W.

*June*: 10° N. 53° W.

**Temperature**: 25.<sub>9</sub>, to 27.<sub>2</sub> (tropical Atlantic); 14.<sub>9</sub> (temperate Atlantic).

**Salinity**: 31.<sub>82</sub> (tropical Atlantic).

**Plankton-type**. The almost complete absence of this species in the ocean proves that it is neritic form; its occurrence north of South America, as well as in the spring in the Skagerak, proves that this species is a very eurythermous form. SCHRÖDER mentions it from Naples. — *Nt*, *Nm*, *Ns*.

**RHIZOLENIA SHRUBSOLEI** Cl.<sup>1</sup>

(PERAGALLO: Le Diatomiste 1892 Pl. XVII fig. 8. 9).

1898 *January*: 20° N. 18° W.

*February*: 34° N. 73° W.

*March*: 18°—21° N. 20°—18° W.; Azores; 41° N. 20° W.; 49° N. 20° W.; 44° N. 48° W.; 41° N. 60° W.

*April*: Azores; 49° N. 12° and 19° W.; 60° N. 4° W.

*May*: 57° N. 25° W. to 60° N. 9° W., more or less rare.

*June*: area between 64° N. 22° W. and 60° N. 4°—9° W., rare; 57° N. 34° W., rare.

*July*: area between 58° N. 32° W., 60° N. 23° W. (common), 60° N. 4° W. and 58° N. 23° W., on the whole rare.

*August*: Azores; area between 58° N. 7° W., 60° N. 2° W., and 60° N. 10° W., rare; 63° N. 25° W. to 64° N. 32° W., rare.

*September*: Färöes, common; 60° N. 2° W.

*October*: 63° N. 12°—13° W., rare; Färöes, rare.

*November*: 63° N. 13° W., rare; Färöes, rare.

<sup>1</sup> Ostenfeld's data used.

1899 *January*: Färöes, rare.

*May*: 58° N. 3° E., rare.

*November*: 51° N. 13' W., rare.

**Temperature**: 12.6, mean of 24 obs., max. 20.1, min. 7.8.

**Salinity**: 35.04, mean of 17 obs., max. 35.54, min. 33.85.

**Plankton-type.** This form has been found in the Mediterranean, the Indian Ocean and at Jedo Bay (Japan). It occurs in the Atlantic rarely or in scattered specimens only, but during the spring and summer gregariously in the Engl. Channel and southern North Sea. It is thus a neritic form, which belongs to the eastern coasts, as it has been seen once only in the Florida Current. As many other species of the southern bank-water it was in the winter seen in the Cape Verde region and in the spring between the Azores and the Engl. Channel. — *Nm.*

### RHIZOSOLENIA STOLTERFOTHII PERAGALLO.<sup>1</sup>

(Le Diatomiste 1892 Pl. XIII fig. 17—18).

1898 *January*: 12° N. 19° W.; 20° N. 18° W.

*March*: 21° N. 18° W.; 41° N. 66° W. to 45° N. 36° W.

*April*: Azores; 48° N. 8° W.; Engl. Channel; 47° N. 40° W.

*May*: 59°—60° N. 15°—13° W.; 45° N. 43° W.; 42° N. 61°—65° W., everywhere rare.

*June*: 10° N. 53° W., rare.

*July*: 59°—62° N. 6°—0° W., rare.

*August*: 60° N. 2°—3° W.; 64° N. 27° W.

*September*: Shetlands, common.

*October*: Orkneys and Shetlands, rare; 41° N. 59°—67° W., not common.

*November*: 47° N. 41° W.; 43° N. 61° W.; 42° N. 64° W., everywhere rare.

*December*: 18° N. 67° W., rare.

1899 *March*: 47° N. 8° W., rare.

*May*: 59° N. 2° E., very rare.

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<sup>1</sup> Ostenfeld's data used.

**Temperature:** 14.<sub>8</sub>, mean of 27 obs., max. 27.<sub>2</sub>, min. 8.

**Salinity:** 35.<sub>06</sub>, mean of 21 obs., max. 36.<sub>11</sub>, min. 32.<sub>60</sub>.

**Plankton-type.** This species occurs along the continental coasts from Cape Verde to the English Channel and west of the British Islands to the Shetlands. Rare specimens drift to the south of Iceland. It occurs also along the North American coast from the Newfoundland Banks at least to 67° W. It has only once been observed north of South America. It is very common in the summer in the English Channel and in the southern North Sea. According to LEMNERMANN it occurs in the Mediterranean, the Pacific and the China Sea. I have seen it in plankton from Jedo Bay. — *Nm.*

### RHIZOLENIA STYLIFORMIS BRTW.<sup>1</sup>

(VAN HEURCK Syn. Pl. LXXVIII fig. 1 5.)

1898 *January:* 0° N. 26° W. to 21° N. 17° W.; Azores to 46° N. 11° W.; 63° N. 20° W.; 7° N. 53° W. to 14° N. 49° W.; Caribbean Sea; 25°—32° N. 74° W.

*February:* 50° N. 10° W.; 63° N. 17° W.; Caribbean Sea; Bahamas; 26° N. 74° W.

*March:* 4°—1° S. 10°—15° W.; 18° N. 18° W.; 25° N. 16° W.; 33° N. 32° W. to the Engl. Channel; from 40° N. 68°—72° W. to 51° N. 27° W. and the Engl. Channel; 15° N. 49° W. and 25° N. 41° W., rare; Caribbean Sea; 28°—32° N. 74° W.

*April:* area between 34° N. 75° W., 40° N. 70° W., the Engl. Channel and 41° N. 19° W.; 58° N. 38° W. to 59° N. 22° W. and at 60° N. 4° W., rare.

*May:* Azores to Cape Finisterre; from New York to the mouth of the Engl. Channel; area between 57° N. 38° W., 61° N. 28° W., 60° N. 9° W. and 57° N. 25° W.; Davis's Strait, 63° N. 54° W., very rare; area between 11° N. 52° W., 16° N. 71° W. and 23° N. 56° W.

*June:* area between 45° N. 26° W., 42° N. 9° W. and 48° N. 17° W.; area between S. Iceland, the Färöes and 60° N. 9° W.; 19° N. 63° W. to 31° N. 50° W.; 41° N. 59° W.; 45° N. 41° W.

<sup>1</sup> Ostenfeld's data used.

- July*: Azores; 48°—50° N. 14°—11° W. (common at 50° N. 11° W.); area between 58° N. 36° W., 62° N. 0° W. and Iceland (common at the Färöes and 62° N. 0° W.); 40° N. 69° W. to 42° N. 48° W.; 25° N. 48° W.; Caribbean Sea; 21° N. 58° W.; 25° N. 74° W.
- August*: Azores; 49° N. 14° W.; 65° N. 35° W. to 60° N. 3° E., maximum S. of Iceland; S.W. of Spitzbergen, 77°—78° N. 9°—12° E.; 47° N. 39° W. to 41° N. 65° W.; 14° N. 70° W. to 38° N. 74° W.
- September*: 30° N. 35° W. to the Azores, rare; 56° N. 28° W., common; 60°—63° N. 27°—26° W. to 59° N. 1° W., maximum W. of the Färöe Channel and S. of the Shetlands; N. of Iceland; rare at 58° N. 39° W., 59° N. 50° W. and 65° N. 36° W.; Beeren Island, 76° N. 16° E.; 9° N. 53° W.; Caribbean Sea; Bahamas; 33° N. 74° W.; 46° N. 48° W.
- October*: Azores, rare; area between 57° N. 42° W., S. Iceland and the Shetlands (maximum N.W. of Rockall); Davis's Strait, 66°—69° N. 54°—55° W., very rare; N. of Newfoundland, 53° N. 52° W. and at 41° N. 58° W., rare; Caribbean Sea; 34° N. 74° W., rare.
- November*: 56° N. 36° W. to 56° N. 17° W., more or less rare; between Iceland and the Färöes, common, thence rarer to the S.W. of Iceland and to the Shetlands; common at 45° N. 50° W., but rare at 53° N. 49° W. and 40° N. 67° W.
- December*: S. of Iceland and at the Färöes, rare; 46° N. 50° W. to 41° N. 66° W., not rare; Brazil Current, 18°—26° S. 38°—45° W., more or less rare; Porto Rico.
- 1899 *January*: Färöes, rare; 45° N. 49° W. and 41° N. 69° W.,  
*February*: Färöes, rare.  
*March*: Azores; 41° N. 21° W. to 49° N. 9° W.  
*April*: Azores to 48° N. 9° W., more or less rare; Färöes, rare; 32° N. 75° W., rare.  
*May*: 47° N. 50° W. to 51° N. 14° W., common at 51° N. 26° W. and 47°—48° N. 50°—45° W.; Färöes, rare; 57° N. 3° E. to 61° N. 1° E., rare.  
*June*: 4° S.—1° N. 19°—23° W., more or less rare; 45° N. 31° W., very rare; 62° N. 1°—2° E. to 66° N. 3° W.  
*July*: 62° N. 0° W., common; 56° N. 38° W., common; 57° N. 31° W., rare.



*August*: 72° N. 26° E., rare; 55° N. 26° W. to 56° N. 38° W., very common.

*September*: 68°—69° N. 8°—10° W., rare; 74° N. 18° E. to 80° N. 13° E., rare to common; 56° N. 23° W. to 53° N. 51° W., common at 33°—40° W.

*October*: 56° N. 23° W., rare; 53° N. 31° W., not rare.

*November*: 52°—48° N. 48°—46° W., rare.

**Temperature**: 12, mean of 38 obs.; max. 26, min. 3.5 (only such samples considered as contained this species abundantly).

**Salinity**: 34.79, mean of 38 obs., max. 36.37, min. 32.32.

**Plankton-type**: This species is found in the Pacific and in the Mediterranean. It appeared in January 1898 in the S. Equatorial Current and followed it to the N. of S. America and into the Caribbean Sea. It was seen in December in the Brazil Current. In the east Atlantic it follows the African coast to the Canaries and the Azores, whence it continues towards the Engl. Channel. In April and May its area of distribution extended across the whole Atlantic between 40° and 50° N. It had, already in May, advanced beyond 60° and reached Iceland in June. From S. Iceland it went towards E. Greenland and was in October seen in Davis's Strait. On the other hand it went from S. Iceland towards the Shetlands. It was seen in September N. of Iceland and, already in August, at Spitzbergen. — S.

### SKELETONEMA COSTATUM (GREV.).<sup>1</sup>

(VAN HEURCK Syn. Pl. XCI fig. 4—6).

1898 *March*: 37° N. 74° W.

*August*: rare in the Irish Channel, at the Shetlands and at Westmannaö.

**Temperature**: 10.2—13.5.

**Salinity**: 34.05 to 34.16.

**Plankton-type**. Found in Jedo Bay, Japan, and in the Gulf of Bengal. It is apparent from the above data, that this species, so abundant near the coasts, is a neritic form. As it occurs in the North Sea and Skagerak together with northern species it is to be considered as belonging to Ns.

<sup>1</sup> Ostenfeld's data used.

**SKELETONEMA TROPICUM CL.**

(K. Sv. Vet. Akad. Handl. Vol. XXXIV n. 1 Pl. VII fig. 30, 31.)

1898 *January*: 6° N. 55° W.*March*: 7° N. 55° W.*June*: 10° N. 53° W., very common.*December*: 29° S. 49° W.**Temperature**: 25.8 mean of 5 obs., max. 27.2, min. 23.5.**Salinity**: 34.53 and 36.01.**Plankton-type**: *N.***STEPHANOPYXIS TURGIDA GREV.**(*Cresswellia* t. Grev. Micr. Journ. Vol. VII, 1859, Pl. VIII fig. 14.)1898 *January*: 21° N. 17° W.*February*: 6°—5° S. 12°—9° E.*March*: 9° N. 17° W.; 21° N. 18° W.; 40° N. 70° W. to 47° N. 27° W., common at 41° and 45° W.*April*: 40° N. 70° W., rare; area between 40° N. 41° W., 47° N. 40° W. (common) and 48° N. 33° W.; 50° N. 3° W.*May*: 48° N. 30° W., rare and dead.*June*: 44° N. 9° W., very rare.*October*: 41° N. 67° W., not rare.*November*: 41° N. 66°—69° W., more or less rare; 51° N. 20° W., not rare.*December*: 41° N. 66° W., very rare.1899 *January*: Canaries, rare; 41° N. 69° W., rare.*February*: 34° N. 40° W., common.**Temperature**: 13.7, mean of 35 obs., max. 27.3 min. 6.**Salinity**: 34.83, mean of 30 obs., max. 36.53, min. 32.20 exceptionally 20.29.**Plankton-type.** This species is, as is seen from the low salinity, a neritic form, occurring along the coast of Africa. In March and April it appeared suddenly between 40°—50° N., from New York to the north of the Azores and simultaneously in the English Channel. After May it had almost completely disappeared from the Atlantic, but in November it appeared again south of Nova Scotia — *Nm.*

**STREPTOTHECA THAMESIS** SHRUBS.

(Cl. A Treatise on the Phyto-plankton Pl. II fig. 19.)

1898 *January*: 48° N. 6° W.*March*: 45° N. 36° W.*April*: 58° N. 2° W.1899 *March*: 48° N. 6° W.*April*: 50° N. 6° W.**Temperature**: 10.<sub>2</sub>, mean of 5 obs., max. 13 min. 8.**Salinity**: 35.<sub>52</sub>.**Plankton-type.** This species occurs in the southern North Sea, in the mouth of the river Thames, at the coasts of Scotland, but in the Atlantic only occasionally. The above mean salinity it therefore to be considered as anomalous. — *Nm.***THALASSIOSIRA GELATINOSA** (HENSEN).

(A. Schm. Nord Sea Diat. Pl. XXXVIII fig. 3.)

1898 *April*: 63° N. 18° W., common.1899 *June*: 69° N. 13° W.; 65° N. 1° W. (deep sea haul from 200 to 0 m.).**Temperature**: 7.**Salinity**: 26.<sub>51</sub>.**Plankton-type.** Found in the Arctic Sea, the North Sea and the Skagerak. It occurs also in the northern Pacific (between Vancouver Island and British Columbia, LEMMERMANX). — *Nj.***THALASSIOSIRA GRAVIDA** CL.<sup>1</sup>(Bih. Kongl. Sv. Vetensk. Akad. Handl. Vol. XXII 3 n. 4 Pl. II fig. 14—16. — GRAN.  
1). Norske Nordhavs Exped. 1876—78 Protöphyta Pl. IV fig. 57—58.)1898 *March*: 74° N. 5° W., rare; 58° N. 6° E; Färöes, rare; 40° N. 68°—69° W.*April*: 66° N. 24° W.; common; S. of Iceland, not rare; Färöes, rare; W. of the Shetlands, rare; 42° N. 17° W. and 40° N. 68° W., rare.<sup>1</sup> Ostenfeld's data used.

- May*: 73° N. 10° W., rare; 72° N. 13° W. to 70° N. 14° W., very common; 68° N. 17° W., rare; Färöes, rare; 68° N. 21° W. to 67° N. 25° W., common; SW. of Greenland, rare; from Cape Farewell to 63° N. 54° W., common.
- June*: 73° N. 5° W., very common; 66° N. 28° W. to 67° N. 29° W., very common; Westmannaö, rare; Färöes, rare; 63° N. 56° W. to 69° N. 54° W.; 59° N. 51° W., common.
- July*: Färöes, common.
- August*: 66° N. 55° W.; 65° 66° N. 36—37° W.; Färöes; N. and W. of Spitzbergen, rare.
- September*: Färöes, rare; 69° N. 53° W., common; 65° N. 55° W., rare.
- October*: Färöes, rare.
- 1899 *March*: 66° N. 20°—24° W., rare; 65° N. 24° W., not rare.
- April*: Färöes, common.
- May*: N., S. and E. of Iceland, more or less rare; Färöes, rare; 61° N. 1° W., common; 75° N. 2° 30' E.
- June*: 73° N. 6° W., rare; 68° N. 7° W., not rare; 76° N. 20° E., rare.
- July*: 71°—74° N. 17°—22° W., more or less rare; 80° N. 12°—14° E., very common to rare; 78° N. 53° E., rare.
- September*: 75° N. 18° E., not rare; 80° N. 13° E., rare.
- Temperature**: 2.7, mean of 22 obs., max. 7.8, min. — 1.5.
- Only such samples considered as contained this species abundantly.
- Salinity**: 34.08, mean of 21 obs., 35.18, min. 31.98.
- Plankton-type**. Arctic form. I have seen it in samples from Hudson Bay. — *T.* (*Ng*, *Ns*).

### THALASSIOSIRA HYALINA GRUN.<sup>1</sup>

(T. CLEVE) GRUN. Norske Nordhavs-Expedition 1876—78, Protophyta Pl. IV fig. 60—62.)

- 1898 *April*: 66° N. 24° W., not rare.
- May*: 72° N. 13° W., common; 67° N. 22° W., not rare; 63° N. 54° W., not rare.
- June*: 66° N. 55° W., very rare; 63° N. 56° W., rare.

<sup>1</sup> Ostenfeld's data used.

*August*: 65° N. 36° W., rare.

1899 *May*: 66° N. 22° W., not rare; 75° N. 2° 30' E., rare.

**Temperature**: 1.8, mean of 4 obs., max. 5 min. — 1.

**Salinity**: 34.59, mean of 4 obs., max. 34.93, min. 34.26.

**Plankton-type**. Noted from the E. and W. Greenland. —  
*Ny (T)*.

### THALASSIOSIRA NORDENSKIÖLDII CL.<sup>1</sup>

(VAN HEURCK Syn. Pl. LXXXIII fig. 9)

1898 *March*: 40° N. 69° W., rare; 40° N. 68° W., common; 42° N. 51° W. to 42° N. 42° W., common; 58° N. 6° E., rare.

*April*: S. and W. of Iceland, not rare; Färöes, rare.

*May*: 72° N. 14° W. to 70° N. 15° W., not rare; N. of Iceland, common; Westmannaö, not rare; Färöes, common; 59° N. 49° W. (common) to 63° N. 54° W., not rare.

*June*: 67° N. 24° W. to 65° N. 29°—31° W., common; Westmannaö; Cape Farewell to 69° N. 54° W.; Färöes, rare.

*August*: Färöes, rare; 65° N. 36° W., rare.

*September*: 69° N. 53° W., rare.

1899 *April*. Färöes, rare to common.

*May*: Westmannaö, rare; Färöes, not rare; 61° N. 1° W., common; 60° N. 2° 30' E., rare; 75° N. 2° 30' E., rare.

*June*: 75°—78° N. 20°—12° E., rare.

*July*: 80° N. 14° E., rare.

*September*: 80° N. 13° E., rare.

**Temperature**: 7.4 max. 16, min. 1.5. Only such samples considered as contained this species abundantly.

**Salinity**: 34.53, mean of 11 obs. max. 36.11 min. 31.98.

**Plankton-type**. Typical arctic species. Its occurrence on the driftice at Cape Vankarema seems to prove that it occurs in the Polar Basin whence in drifts along the coasts in the Arctic regions. I have seen it in samples from Hudson Bay and from the northern

<sup>1</sup> Ostenfeld's data used.

Pacific, at Puget's Sound. LEMMERMANN mentions it from Bara Island, between Vancouver Island and the British Columbia. In the years 1871-75 it was exceedingly abundant in the arctic regions not only along the coasts, but in the open sea. In the years 1896-99 it had not that important part in the arctic plankton. — *Ny.*

### THALASSIOTHRIX FAUENFELDII GRUN.<sup>1</sup>

(VAN HEURCK Syn. Pl. XXXVII fig. 11-12).

1898 *March*: 21° N. 18° W., rare; 61° N. 11° W., common; 58° N. 6° E.

*April*: 39° N. 24° W.; S. of Iceland; 59°—60° N. 4°—29° W.

*May*: 60° N. 9° W. to 57° N. 28° W., common N. and W. of Rockall.

*June*: 63° N. 19° W. to 60° N. 7° W., rare.

*July*: S. and W. of Iceland; 60° N. 17° W.

*September*: 60° N. 11° W.

*October*: 61° N. 5° W. to 57° N. 27° W., more or less rare.

*November*: S. Iceland to the Shetlands, more or less rare.

*December*: 61° N. 6° W., rare; 62° N. 10° W. not rare.

1899 *April*: 48° N. 9° W., rare.

*May*: 58° N. 4°—7° E.; common.

**Temperature**: 10.<sub>1</sub>, mean of 11 obs., max. 15, min. 6.

**Salinity**: 34.<sub>21</sub>, mean of 8 obs., max. 35.<sub>55</sub>, min. 26.<sub>51</sub>.

**Plankton-type**. Noted from Japan. — *Ns.*

*Remark*. Most of the above data are from *Ostenfeld*. I have found this form only very rarely in the ocean, but very abundantly during the winter and spring in the plankton of the Skagerak. It may be possible that at least some of *Ostenfeld*'s data relate to the variety *Javanica*.

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<sup>1</sup> *Ostenfeld*'s data used.

**THALASSIOTHRIX (FAUENFELDII VAR.) JAVANICA GRUN.**

(VAN HEURCK: Synopsis Pl. XXXVII fig. 13.)

1898 *April*: 49° N. 12° and 23° W.*May*: 49° N. 17° and 23° W.*November*: 56° N. 26° and 36° W.1899 *May*: 51° N. 26° W.*October*: 53° N. 31° W., not rare.**Temperature**: 13.<sub>2</sub>, mean of 5 obs., max. 23, min. 7.<sub>8</sub>.**Salinity**: 35.<sub>30</sub>, mean of 7 obs., max. 35.<sub>56</sub>, min. 35.<sub>00</sub>,**Plankton-type**: S.**THALASSIOTHRIX LONGISSIMA CL. & GRUN.<sup>1</sup>**(*Synedra Thalassiothrix* CL. Bih. Kongl. Sv. Vetensk. Akad. Handl. 1 n. 13 pag. 22).1897 *December*: and1898 *January*: 21° N. 18° W., rare; 32° N. 33° W., rare; 41° N.

21° W. to 48° N. 6° W.; 37° N. 73° W.

*February*: 38° N. 74° W., rare.*March*: 71° N. 1° 30' W., rare; 68° N. 26° W., rare; Azores to the English Channel (more or less abundant), thence along 48°—49° N. to 33° W.; 23° N. 17° W., rare; 43° N. 45° W. to 40° N. 71° W.*April*: 74°—75° N. 5°—9° W., more or less rare; 58°—60° N. 4°—28° W., common at 22° W., else rare; 40°—50° N., 7°—70° W., varying from rare to common; Azores to the Engl. Channel; 59° N. 47° W., rare.*May*: 77° N. 2° 30' W. to 70° N. 15° W.; from the Färöes to Greenland, along 57°—59°, not common; 63° N. 54° W., rare; 49°—47° N. 22°—32° W.*June*: 63° N. 13° W. to 60° N. 9° W.; Färöes, rare; Denmark's Sound, 65°—66° N. 29°—31° W., more or less rare; 57° N. 34° W. (very common) to 57° N. 46° W., rare; 41° N. 58° W.*July*: 65° N. 5° W., common; 64° N. 3° W., rare; 62° N. 4°—0° W., rare; 60° N. 17° W. to 57° N. 47° W., on the whole not rare.<sup>1</sup>. Ostenfeld's data used.

- August:* S. of Iceland, rare; Davis's Strait, 62° N. 53' — 56° W., very rare; Färöes, rare; 58° N. 2° W., rare; Azores, very rare.
- September:* 66° N. 18° W., common; Färöes, not rare; 59° N. 1° W., to 60° N. 10° W., more or less rare; 63° N. 25° W. to 65° N. 36° W., rare; 59° N. 49° W. and 69° N. 53° W., rare.
- October:* Färöes to 57° N. 27° W. and 58° N. 32° W., rare; 48° N. 38° W., rare; 41° N. 59° W., rare.
- November:* Iceland to the Färöes, rare; 50° N. 10° W. to 47° N. 42° W., on the whole rare, but common at 51° N. 20° W.; 43° N. 61° W. to 42° N. 64° W., rare.
- December:* 50° N. 9° W., rare; 43° N. 10° W., rare; 49° N. 30° W. to 41° N. 66° W., rare to common.
- 1899 *January:* 43° N. 57° W., rare.
- February:* 34° N. 40° W., very rare.
- March:* Färöes, rare; 49° N. 9° W., not rare; 47° N. 7° W., rare; Azores, rare.
- April:* 49° N. 7° W., rare; 44° N. 15° W., not rare.
- May:* Färöes, rare; 58° N. 4° E., rare; 51° N. 20° W., rare; 50° N. 39° W., rare; 47° — 48° N. 50° — 45° W., common.
- June:* 66° N. 3° W. to 70° N. 13° W., rare.
- July:* 56° N. 38° W. to 53° N. 51° W., as a rule rare, but very common at 45° W.
- September:* 73° N. 19° E., not rare.
- October:* 56° N. 31° W., rare.
- November:* 51° N. 13° W., rare.

**Temperature:** 9.6, mean of 19 obs., max. 14, min. 4. Only such samples considered as contained this species abundantly)

**Salinity:** 34.48, mean of 21 obs., max. 35.87, min. 32.82.

**Plankton-type.** This species was found by the Vega Expedition abundantly in the Bering Sea. It is represented in the Antarctic seas by a much coarser form, which was found there by the Challenger Expedition in great abundancy. It is a typical arctic form, that has about the same geographical distribution as *Calanus finmarchicus*. — *T.*

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## Murracytæ, Cystæ.

### HEXASTERIAS PROBLEMATICA CL.

(Kongl. Sv. Vetensk. Akad. Handl. Vol. XXXII n. 8 pag. 22.

1898 *July*: Färöes.

*October*: Westmannaö.

*November*: 56° N. 23° W.; 51° N. 2° W.

1899 *May*: 66° N. 22° W.; 62° N. 7° W.

**Temperature**: 7.1, mean of 5 obs., max. 10.8, min. 3.1.

**Salinity**: 34.84, mean of 5 obs., max. 35.32, min. 34.21.

**Plankton-type**. This species belongs evidently to the arctic and boreal regions. — *T*.

### HYALOPHYSA DELICATULA CL.

(Kongl. Vet. Akad. Handl. Vol. XXXIV n. 1, Pl. VIII fig. 1, 2.)

1898 *August to December*: Azores, common.

1899 *January*: 33° N. 15° W.

**Temperature**: 17.2 to 21.2.

**Salinity**: 36.25 to 36.34.

**Plankton-type**: S ?

### PYROCYSTIS FUSIFORMIS J. MURRAY.<sup>1</sup>

(Proceed Roy. Soc. London Vol. XXIV, 1876, pag. 21.)

1898 *January*: 15° S. 36° W.; 9°—10° N. 26°—25° W.; Azores to 32° N. 34° W.

<sup>1</sup> Murray's & Whitting's data used.

*February*: 31° N. 35° W. to 19° N. 52° W.; Caribbean Sea.

*March*: 4° S. 10° W. to 17° N. 47° W.; Caribbean Sea; 28° —32° N. 74° W.; 40° —44° N. 64° —51° W.

*April*: 22° N. 47° W. to 29° N. 38° W.; Caribbean Sea.

*May*: 13° N. 51° W.; 41° N. 51° W.

*August*: 40° —44° N. 66° —57° W.

*September*: 41° —42° N. 65° —57° W.

*November*: 9° S. 34° W.; 40° —44° N. 67° —55° W.

*December*: 29° S. 49° W.

1899 *April*: 36° N. 74° W.

**Temperature**: 21.5, mean of 27 obs., max. 28, min. 12.

**Salinity**: 35.40, mean of 12 obs., max. 38.54, min. 32.87.

**Plankton-type**: *D*.

### PYROCYSTIS HAMULUS CL.

K. Vetensk. Akad. Handl. Vol. XXXIV n. 1 Pl. VII fig. 23).

1897 *December* and

1898 *January*: 12° N. 50° W.; 29° N. 74° W.

*February*: 16° N. 71° W.

*March*: 14° —15° N. 50° —49° W.

*June*: 27° N. 55° W.

*July*: 26° N. 48° W.

*October*: 30° N. 74° W.

1899 *February*: 32° N. 47° W.

**Temperature**: 21.22, mean of 9 obs., max. 27, min. 19.8.

**Salinity**: 36.52, mean of 7 obs., max. 37.04, min. 36.21.

**Plankton-type**. Occurs in the Indian Ocean. It belongs to the western tropical Atlantic (12° —32° N.). — *D*.

### PYROCYSTIS LANCEOLATA SCHRÖDER.

(Mitth. zool. stat. Neapel Vol. XIV, 1900 pag. 13 fig. 11.)

1899 *March*: 37° N. 26° W.

**Temperature**: 15.7.

**Salinity**: 36.30.

**Plankton-type**: *S* ?.

**PYROCYSTIS PSEUDONOCILUCA J. MURRAY<sup>1</sup>.**

(Proceed Roy Soc. London Vol. XXIV, 1876, pag. 532 Pl. XXI.)

1897 *December* and1898 *January*: 15°—13° S. 37°—35° W.; 0—2° N. 31°—32° W.; 7°—11° N. 53°—52° W.; Caribbean Sea to 35° N. 74° W.; area between 9°—10° N. 26°—25° W., 23°—24° N. 51°—50° W. and 33° N. 32° W.*February*: 5° S. 9°—4° E.; 20° N. 51° W. to 30° N. 37° W.; Caribbean Sea to 26° N. 74° W.*March*: area between 1° S. 15° W., 36° N. 29° W. and 9° N. 53°—59° W.; Caribbean Sea to 32° N. 74° W.*April*: area between 25° N. 43° W., 16° N. 58° W. and 10° N. 53° W.; Caribbean Sea to 31° N. 75° W.*May*: area between 36° N. 27° W., 17° N. 50° W. and 20° N. 60° W.; 41° N. 51°—63° W.*June*: 31° N. 17° W.; area between 29° N. 36° W., 10° N. 53° W., 22° N. 60° W. and 27° N. 55° W.; 60° N. 4° W. (not rare, Ostenfeld).*July*: 26° N. 48° W. to 21° N. 58° W.; Caribbean Sea; 29°—38° N. 74° W.; 41° N. 60° W. to 42° N. 48° W.; 58° N. 22° W.*August*: Azores; Caribbean Sea to 34° N. 74° W.; 40° N. 66° W. to 47° N. 39° W.*September*: 12° N. 27° W.; 23° N. 42° W.; Madeira; Azores; 20°—33° N. 74° W.; 41° N. 65° W. to 42° N. 57° W.; 60° N. 6° W. (rare).*October*: 21° S. 30° W.; Caribbean Sea; 34° N. 74° W.; 42° N. 50° W.; Azores; 60°—61° N. 4°—5° W.*November*: 24° S. 30° W.; 9° S. 34° W.; 4° N. 30° W.; 19° N. 58° W. to 29° N. 43° W.; Azores; 24° N. 21° W.; 42° N. 64° W.; 47° N. 41° W.*December*: 14° S. 26° W.; Caribbean Sea; 22° N. 56° W.; 25° N. 52° W.; Azores; Canaries.1899 *March*; 21° N. 43° W.; 36° N. 74° W.<sup>1</sup> Ostenfeld's, Murray's & Whitting's data used.

*April*: 32° N. 75° W.

*May*: 35° N. 74° W.

*June*: 11° S. 10° W.; 15° N. 50° W. to 21° N. 45° W.

*July*: 28° N. 40° W.

**Temperature**: 23.<sub>88</sub>, mean of 130 obs., max. 28.<sub>33</sub>, min. 14.<sub>6</sub>.

**Salinity**: 35.<sub>98</sub>, mean of 97 obs., max. 38.<sub>54</sub>, min. 32.<sub>51</sub>.

**Plankton-type**. Noted from Red Sea and the Indian, Pacific Oceans. It occurs in the whole tropical Atlantic, from 25° S. to somewhat north of 40° N., exceptionally to the Färöe Channel. Not found between the Azores and the European coast. — *D*.

### XANTHIDIUM HYSTRIX CL.

(Kongl. Sv. Vetensk. Akad. Handl. Vol. XXXII n. 8 pag. 21.)

1898 *March*: 21° N. 18° W.

*October*: 57° N. 18° W.

*November*: 56° N. 17° W.

*December*: 44° N. 57° W.

*November*: 51° N. 13 and 28° W.

**Temperature**: 12, mean of 4 obs., max. 15, min. 11.

**Salinity**: 34.<sub>48</sub>, mean of 3 obs., max. 35.<sub>14</sub>, min. 32.<sub>72</sub>.

**Plankton-type**. This form occurs sparingly, but frequently, in the Tripos-plankton of the North Sea. — *S*.

### XANTHIDIUM MULTISPINOSUM MOEB. l

、 (Fünfte Ber. d. Kommiss. zu Kiel pag. 124 Pl. VIII fig. 62—65.)

1898 *July* 62° N. 0° W.

*August*: 60° N. 3° E.

*September*: 61° N. 2° W.

*November*: 56° N. 23° W.

1899 *September*: 56° N. 23° W.

*October*: 56° N. 23° W.

**Temperature**: 10.<sub>8</sub> to 11.<sub>5</sub>.

**Salinity**: 35 to 35.<sub>32</sub>.

**Plankton-type**: *S*.

**XANTHIDIUM PAUCISPINOSUM** CL.

(K. Sv. Vetensk. Akad. Handl. Vol. XXXIV n. 1 Pl. VII fig. 24.).

1898 *October and November*: Azores.

1899 *April*: 9° N. 59° W.

**Temperature**: 18.5 to 25.1.

**Salinity**: 35.60 to 36.18.

**Plankton-type**: S ?.

## Silicoflagellatæ.

### DISTEPHANUS SPECULUM EHB.<sup>1</sup>

*Dictyocha spec.* EHB. Microgeol. Pl. XVIII fig. 57 etc.)

- 1898 *March*: 44° N. 17° W.; 45° N. 13° W.  
*April*: 39° N. 24° W.; 49° N. 22°—23° W.  
*May*: 58°—59° N. 21°—15° W.; 63° N. 54° W. and 17°—10° W.  
*June*: 40°—42° N. 10°—9° W.  
*July*: 60° N. 23° W.; 61° N. 8° W.  
*August*: 65° N. 36° W.; 69° N. 53° W.; 76° N. 11° E.  
*September*: 57° N. 14° W.; 60° N. 11° W.; 76° N. 13° E.  
*October*: 58°—59° N. 25°—16° W.; 60° N. 4° W.; 62° N. 7° W.  
*November*: 56° N. 23°—36° W.; 45° N. 50°—52° W.; 41° N. 69° W.  
*December*: 45° N. 50° W. to 42° N. 63° W.
- 1899 *January*: 48° N. 39° W.; 41° N. 69° W.  
*April*: 48° N. 9° W.

**Temperature:** 10.4, mean of 23 obs., max. 15.8, min. 5.

**Salinity:** 34.05, mean of 19 obs., max. 35.60, min. 31.96.

**Plankton-type.** Common in the southern Atlantic. Occurs in Puget's Sound. — *T.* ?

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<sup>1</sup> Ostenfeld's data used. — *Dictyocha fibula*, see Radiolaria.

## Flagellatæ.

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### DINOBRYUM PELLUCIDUM LEVANDER.<sup>1</sup>

(Acta Soc. p. Fauna u. Flora Fennica Vol. XII 2. 1894, pag. 31 Pl. II fig. 1.)

1898 *May*: 72° N. 14° W., rare.

*June*: 68° N. 23° W.

*August*: N. and N.E. of Spitzbergen; Disco.

*September*: Disco.

1899 *June*: 72° N. 18° E. to 78° N. 12° E.

*July*: N.W. and N. of Spitzbergen; 73° N. 36° E.; 78—79° N. 53° E.; 71° N. 21—22° W.

*August*: 76—78° N. 41—47° E.; 71—72° N. 20° W.

*September*: Beeren Island.

**Temperature**: 1.9, mean of 24 obs., max. 7.8, min. —1.3.

**Salinity**: 32.94, mean of 20 obs., max. 35.63, min. 28.01.

**Plankton-type**: *Nf*.

### PHÆOCYSTIS POUCHETII (HARIOT).<sup>1</sup>

(LAGERHEIM: Öfvers. Kongl. Sv. Vet. Akad. Förh. 1896 n. 4 pag. 277.)

.. 1898 *March*: 40° N. 69° W.

*April*: 57—59° N. 43—49° W., very common.

*May*: Färöes, very common; W. of the Shetlands.

*June*: 66° N. 55° W. (rare) to 57° N. 42° W. (common); 73° N. 23° E. to 77° N. 26° E., more or less common.

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<sup>1</sup> Ostenfeld's data used.

*July*: S. of Greenland; along the S. coast of Iceland; 68° N. 8° W., common; 78° N. 3° W., common.

*August*: N. of Spitzbergen, not rare.

*September*: Westmannaö, very common.

1899 *May*: area between 62° N. 2° E., 60° N. 1° E. and 58° N. 3° E., very common.

*June*: 71° N. 8°—10° W. to 69° N. 13° W., as a rule very common; 66° N. 2° E., very common; 71°—75° N. 6°—20° E., not common.

*July*: 74° N. 20° W., rare.

*August*: 80° N. 51° E., common.

*September*: 76°—74° N. 16°—18° E., rare.

**Temperature:** 5.8, mean of 25 obs., max. 9.5, min. —1. (Only such samples considered as contained this species in abundance).

**Salinity:** 34.84, mean of 24 obs., max. 35.39, min. 33.20.

**Plankton-type.** According to the above statements this species is to be considered as arctic with its southern limit at about 57° N., but other years this limit goes so far down as to about 50° N. — *T. C.*



## Phycochromaceæ.

### TRICHODESMIUM ERYTHRÆUM EHB.

(GOMONT: Ann. Sc. nat. 7 ser., Bot. Vol. XVI pag. 196 Pl. V. fig. 27—30.)

1898 *December*: 28° S. 42° W.; exceedingly abundant.

### TRICHODESMIUM THIEBAULTII GOMONT.

(Ann. Sc. nat. 7 ser. Bot. Vol. XVI pag. 197 Pl. VI fig. 2—4. *Heliotrichum radians* Ville: *Ergebn. d. Plankt. Exp.* 1 pag. 278 fig. 87, 88.)

1897 *December*: and

1898 *January*: 7° N. 22° W. to 0° N. 26° W.; 13°—15° S. 35°—37° W.; 31° N. 31° W. to 11° N. 52° W.; Caribbean Sea; 25°—35° N. 74° W.

*February*: 5° S. 4°—9° E.; 4° S. 10° W.; Caribbean Sea; 21°—34° N. 74°—73° W.

*March*: 0° 30' S. 15°—26° W. to 31° N. 29° W. and thence to 9° N. 53°—59° W.; 41° N. 23° W.; Caribbean Sea; 28°—32° N. 74° W.;

*April*: 15° N. 49° W. to 10° N. 53° W.; Caribbean Sea; 23° N. 72° W. to 27° N. 75° W.

*May*: area between 26° N. 42° W., 28° N. 47° W., 16° N. 71° W. and 11° N. 52° W.; 41° N. 51° W.°

*June*: area between 19° N. 63° W., 31° N. 50° W. and 19° N. 63° W.

*July*: 26° N. 48° W. to 15° N. 72° W.; 29° N. 74° W. to 38° N. 74° W. and thence to 42° N. 48° W.

*August*: 17° N. 71° W. to 38° N. 74° W. and thence to 47° N. 39° W.

- September*: Cape Verde Islands; Madeira; 26° N. 39° W. to 9° N. 53° W.; 20° N. 73° W. to 38° N. 74° W. and thence to 42° N. 57° W.
- October*: 16° N. 70° W. to 34° N. 74° W.; 57°—59° N. 27°—21° W., rare.
- November*: 9° S. 34° W. to the Canaries; Azores to 19° N. 58° W.
- December*: 26° S. 45° W. to 14° S. 39° W.; Canaries; 25° N. 52° W. to 19° N. 58° W.; Caribbean Sea.
- 1899 *January*: 33°—34° N. 15°—12° W.
- February*: 32° N. 47° W.
- March*: 18°—24° N. 45°—40° W.
- April*: 28°—32° N. 75° W.
- June*: 5°—7° N. 24°—25° W.; 15° N. 50° W. to 24° N. 42° W.
- July*: 23°—28° N. 36°—40° W.

**Temperature:** 24.5, mean of 154 obs., max. 28.4, min. 13.

**Salinity:** 35.46, mean of 120 obs., max. 38.54, min. 33.20.

**Plankton-type.** Occurs in the Mediterranean (SCHRÖDER). The area of distribution is the whole tropical and subtropical Atlantic, on the Northern hemisphere to the left of a line drawn from the Canaries to Newfoundland. It occurs the whole year in the warm current north of S. America and in the Sargasso Sea, appears, although sparingly, in May north of 40° N., but reaches in August a maximum between 40°—45° N., where it remains sparingly in October. In the last named month some rare specimens had drifted nearly to 60° N. — *D.*

## CORRIGENDA.

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- p. 17 l. 1 for  $T$  read  $S$ .  
» l. 13 from foot for  $72^{\circ}$  N. read  $59^{\circ}$  N.  
p. 23 l. 3 from foot for thed read the.  
p. 67 l. 1 from foot for arkremable read remarkable.  
p. 128 l. 4 from foot for become read became.  
p. 221 l. 8 from foot for arcoss read across.
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